

DeQuMa - Tutorial

How to use the
ZVEI - DeltaQualificationMatrix

Working Group PCN Methodology - ZVEI-DeQuMa Revision 5.1 - 06/2024

TOP I

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

June 2024 | DeQuMa Revision 5.1

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

What is the DeQuMa?

It's a tool to describe the requested change, the evaluation level and the test which should be considered for qualification based on common international standards (AEC-Q10x, AEC-Q200, AQC-324).

Motivation – Why to use?

Standardized scope of Qualification for selection of tests. Common understanding for tests and changes will decrease the PCN throughput time.

Do not use for Information Notes!

The DeQuMa should only be submitted in case of changes which are assessed as “P”.

For changes which are assessed as “I” the DeQuMa is not necessary.

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Please take note:

In some cases – e.g. if the ZVEI DeQuMa file is stored on **OneDrive** – the functionality of the Excel macros may not work correctly or may work incomplete.

If so, please store the ZVEI DeQuMa file locally on your computer hard disk.

Furthermore: If a linkage between ZVEI DeQuMa and PCN Form file is needed (see page 14 and following), please store both files in the same local folder.

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Content of the DeQuMa (Overview Sheets)

The screenshot shows the DeQuMa interface with several tabs and associated qualification matrices:

- Guidance**: further instructions and descriptions
- History**: DeQuMa Releases
- Active Components**: matrix for Active Components (AEC-Q100 and AEC-Q101)
- Optoelectronic Components**: matrix for Optoelectronics (AEC-Q102)
- OE-MCM**: matrix for Optoelectronic Multi-Chip-Modules (AEC-Q102-003)
- MEMS**: matrix for MEMS (AEC-Q103)
- MCM**: matrix for MCM (AEC-Q104)
- Passive Components**: matrix for Passive Components (AEC-Q200)
- Power-Modules**: matrix for Power Modules (AQG-324)

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Example - DeQuMa for Active Components

- 1a) Select respective sheet
- 1b) Complete header data. Select in sheet "Active Component" if AEC-Q100 or AEC-Q101 is applicable.

Worked on: (Name, Function) Max Mustermann

Signature:

Date:

PCN number:

For integrated circuits or discrete semiconductors select below: AEC-Q100 Revision H

Hide Text

Values: Hide Rows

Values: Hide Columns

Form provided by ZVEI - Revision 8.0 - December 2021

Assessment of impact regarding following aspects

- contractual agreements
- technical interface of handling/processability/manufacturability of customer
- form, fit, function, quality performance, reliability

Potential impact?

Understanding of semiconductors experts

Examples to explain

Further applicable conditions

Mark change with an "x"

ID

Type of change

ANY

ID	Type of change	No	Yes	Understanding of semiconductors experts	Examples to explain	Further applicable conditions
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.		
DATA SHEET						
SEM-DS-01	Change of data sheet 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	
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	
SEM-DS-03	Description of a new not previously covered parameter. No technical change of the product. (If: Definition of new parameter which was not	I	I		e.g. adding new tested parameter.	

Guidance History **Active Components** Optoelectronic Components OE-MCM MEMS MCM Power Module Passive Components

1a

Bereit

Guidance History **Active Components** Optoelectronic Components OE-MCM MEMS MCM Power Module Passive

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Example - DeQuMa for **Passive** Components

For **Passive** components:

1c) in Order to reduce the number of lines (> 400) select a product group first

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

Hide Text
 Values: Hide Rows Values: Hide Columns

Form provided by ZVEI - Revision 5.0 - December 2021

ID	Type of change	Understanding of component experts	Examples to explain	Evaluation level A / B / C	Further applicable conditions	Line evaluation (can be evaluated by data or audition site check)	AEC-Q200 Revision D			
							Check of specification (for raw material only)	High Temp Exposure (Storage)	Temperature Cycling	
Assessment of impact regarding following aspects - contractual agreements - technical interface of handling/processability/manufacturability of customer - form, fit, function, quality performance, reliability										
	ANY									
	PAS-RES-AN-01	Any change with impact on agreed upon technical contractual agreements	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.	*	-	-	-	-	-
	PAS-RES-AN-02	Any change with impact on processability of the matrix design	Technical interface means component terminals.	B		-	-	-	-	-
DATA SHEET										
	PAS-RES-DS-01	Change of data sheet parameters and specification	Change of application relevant information Not included: Editorial changes.	e.g. tighten of electrical parameter distribution	A	-	-	-	-	-
	PAS-RES-DS-02	Correction of data sheet or issue of errata	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	-	-	-	-	-
	PAS-RES-DS-03	Specification of additional parameters	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 parameters (stat. evaluation)	e.g. adding new (tested) parameter.	A	-	-	-	-	-

Mark change with an "x"

1c

Von A bis Z sortieren
 Von Z bis A sortieren
 Nach Farbe sortieren
 Tabellenansicht
 Filter löschen aus "Selection of com..."
 Nach Farbe filtern
 Textfilter
 Suchen

- (Alles auswählen)
- AI-Cap
- CERAMIC / TANTALUM
- Film capacitors
- INDUCTORS
- NETWORKS & RESISTORS
- PTC
- QUARTZ CRYSTAL / SAW
- VDR

OK Abbrechen

Selection of component

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Example - DeQuMa for Active Components

Worked on: (Name, Function)	Max Mustermann																				
Signature:																					
Date:																					
PCN number:																					
For integrated circuits or discrete semiconductors select below:	AEC-Q100 Revision H																				
<p>Hide Text</p> <p>Values: Hide Rows Values: Hide Columns</p> <p>Form provided by ZVEI - Revision 5.0 - December 2021</p>																					
		Assessment of impact regarding following aspects - contractual agreements - technical interface of handling/processability/manufacturability of customer - form, fit, function, quality performance, reliability				Potential impact?	Understanding of semiconductors experts	Examples to explain													
			No	Yes																	
	ID	Type of change																			
	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														
	DATA SHEET																				
	SEM-DS-01	Change of data sheet 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 I/O pins, MSL													
	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 Infotext contains this type of change! Assessment in application required!	e.g. Errata													
	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.													
	DESIGN																				
	SEM-DE-01	Design changes in active elements ¹⁾	P	P			Any device relevant changes in design / layout of elements with effect on specified electrical behavior. ¹⁾ Not included: Modification to adjust product parameter within specified process window and design rules.	Change of ESD structure 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 specified electrical behavior. 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) e.g. Connecting / disconnecting an already existing transistor through routing	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: saving streets/kerf/scribe line	Typical shrink of die.	A	Please check if change in process technology (SEM-PV-09) is also affected.											
	Integrated software by design or memory as																				

2) Select all changes for the PCN in column B.

ATTENTION !

ALL changes per PCN need to be marked in column B by "X" ...

3) If the wording for the change category you selected (column D) is not clear enough, you will find additional explanations for the specific category in column G and H.

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Example - DeQuMa for Active Components

Form provided by ZVEI - Revision 5.0 - December 2021

		Evaluation level A / B / C	Further applicable conditions	MATERIALS includes integrated circuits (e.g. microprocessors)										
Understanding of semiconductors experts	Examples to explain	A: Application level B: Board level C: Component level *: Not relevant for qualification matrix		AEC-Q100 Revision H	Check of specification (for new material only)	THB	AC	Autoclave or Unbiased HAST	TC	PTC	High Temperature Storage Life	HTSL	A6	
Any device relevant changes in design / layout of elements with effect on specified electrical behavior. *) 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)	•	-	-	•	•	M	-				
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	•	-	-	-	E	M	-				
SS - WAFER PRODUCTION*)														
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 e.g. change of external bumps of a BGA e.g. Change of external pins of a hermetic package	B		•	•	•	•	•	M	•				
		A		•	•	•	•	E	M	•				
n table.				•	•	•	•	E	M	•				

4a

4b

4c

4a) Evaluation level should be used as recommendation for scope of qualification at Tier1 (given by ZVEI community).

4b) Appropriate level might vary for special cases. Please enter character accordingly.

4c) In case of different evaluation levels are affected (see 4b), the highest evaluation level will be automatically shown (in the line “Tests, which should be considered for the appropriate process change”).

Instructions how to use the DeltaQualificationMatrix (DeQuMa) Example - DeQuMa for Active Components

Worked on: (Name, Function)		Max Mustermann												
Signature:														
Date:														
PCN number:														
For integrated circuits or discrete semiconductors select below:		AEC-Q100 Revision H												
Hide Text														
Values: Show Rows		Values: Show Columns												
Mark change with an "x"														
Assessment of impact regarding following aspects - contractual agreements - technical interface of handling/processability/manufacturability of customer - form, fit, function, quality performance, reliability		Potential impact?		Understanding of semiconductor experts		Examples to explain		Further applicable conditions		Device evaluation		additional		
ID		Type of change		No		Yes		A: Additional test B: Discontinued test C: Not relevant for qualification matrix		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, ...)		Remarks		
ANY														
DATA SHEET														
DESIGN														
SEM-DE-01		Design change in active elements (*)		P		P		Any device element change is a design / layout of elements with effect on specified electrical behavior. * Not included: Modifications to adjust product parameter within specified process window and design rules.		e.g. change of ESD protection e.g. add / remove a transistor in layout		A	Please check if data sheet is affected (EM-DS-01)	
PROCESS - WAFER PRODUCTION														
SEM-FV-03		New final outer thickness		P		P		Change in final die thickness.		e.g. change in final die thickness		C	A: If thermal conductivity is affected (e.g. MOSFET, IGBT, BGA package, stacked die, ...) A: If report on EMC or ESD behavior cannot be evaluated / included on component level.	
BARE DIE (Wafer process changes not covered in this section shall be handled according to section "PROCESS - WAFER PRODUCTION")														
PROCESS - ASSEMBLY														
SEM-PA-05		Change of lead and bond step height/mounting thickness (normal)		P		P		Change in material and/or process resulting in a new technology (e.g. paste etc.)		e.g. change in bond step height e.g. change from 150µm to 100µm e.g. change of tape thickness e.g. change of external shape of a BGA e.g. Change of external part of a hermetic package		B		
PACKAGING/SHIPPING														
EQUIPMENT														
TEST FLOW														
GATE														
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 'Q' for generic)														
Reason for exception of tests and/or usage of generic data:														
Legend:														
- 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														
A Only for peripheral routing														
B For symbol rework, new cure time, temp														
C If bond to leadfinger														
D Design rule change														
E Thickness only														
F MEMS elements only														
H Hermetic only														
J EPROM or EEPROM														
L Lead free														
M For devices requiring PTC														
N Passivation and gate oxide														
P Passivation and interlevel dielectric														
Q Wire diameter decrease														
T Only for Solder Ball SMD														
# Only from non-100% burned-in parts														
* For "burn in" changes IOL or ELFR recommended														
=> Please mark 'NO' with 'x', default is 'YES'														

5) The yellow section shows the stress tests which should be considered for the appropriate changes

6) The condition table needs to be completed for non-relevant part details

→ Please mark for "No" with "X", default is "YES" (in this example J,M)

The condition table can be found at the bottom of each matrix (except Power Modules)

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

- A Only for peripheral routing
- B For symbol rework, new cure time, temp
- C If bond to leadfinger
- D Design rule change
- E Thickness only
- F MEMS element only
- H Hermetic only
- J EPROM or EEPROM
- L Lead free
- M For devices requiring PTC
- N Passivation and gate oxide
- P Passivation and interlevel dielectric
- Q Wire diameter decrease
- T Only for Solder Ball SMD
- # Only from non-100% burned-in parts
- * For "burn in" changes IOL or ELFR recommended

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

6

No
X
X

Instructions how to use the DeltaQualificationMatrix (DeQuMa) Example - DeQuMa for Active Components

Hide Text		Values: Show Rows		Values: Show Columns		Form provided by ZVEI - Revision 5.0 - December 2021	Evaluation level A / B / C	Further applicable conditions	AEC-Q100 Revision H	Check of Specification (for material only)	Temperature Humidity Bias or biased HUST	Temperature Cycling	Temperature Cycling	Power Temperature Cycling	High Temperature Storage Life	High Temperature Operating Life	Early Life Failure Rate	HMM Endurance, Data Retention, and Operational Life	Wire Bond Shear	Wire Bond Pull	Solderability	Lead Integrity	Electromigration	Time Dependent Dielectric Breakdown	Hot Carrier Injection
ID	Type of change	Potential impact?	No	Yes	Understanding of semiconductors experts	Examples to explain	A: Application level B: Board level C: Component level - Not relevant for qualification matrix			THB	TC	TC	PTC	HTSL	HTOL	ELFR	EDR	MBS	WBP	SD	LI	EM	TDDB	HCI	
ANY																									
DATA SHEET																									
DESIGN																									
X	SEM-DE-01	Design changes in active elements. 1)	P	P	Any device relevant changes in design / layout of elements with effect on specified electrical behavior. 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).	•	-	-	•	•	M	-	•	•	D	J	-	-	-	D	D	D
PROCESS - WAFER PRODUCTION																									
X	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.	•	-	-	-	E	M	-	•	•	-	E	E	-	-	-	-	-
BARE DIE (Wafer process changes not covered in this section shall be handled according to section "PROCESS - WAFER PRODUCTION")																									
PROCESS - ASSEMBLY																									
X	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 NiPd/Au e.g. change of layer thickness e.g. change of external bumps of a BGA e.g. Change of external pins of a hermetic package	B		•	•	•	•	•	M	•	-	-	-	-	C	•	•	-	-	-
PACKING/SHIPPING																									
EQUIPMENT																									
TEST FLOW																									
Q-GATE																									
Tests, which should be considered for the appropriate process change.							A		•	•	•	•	E	M	•	•	•	D	J	E	C	E	•	D	D
Tests, which should be considered for the appropriate process change after selection of condition table.									•	•	•	•	E	-	•	•	•	•	D	E	C	E	•	D	D
Suppliers performed tests (mark with an 'X' for done or 'G' for generic)																									
Reason for exception of tests and/or usage of generic data:																									

7a) This line provides a summary of all stress tests of selected changes excluding selection from condition table.

7b) This line provides a summary of all stress tests incl. selection from condition table* according to the recommendations of the international standards.

*(in this example J,M)

7a
7b

Instructions how to use the DeltaQualificationMatrix (DeQuMa)

Example - DeQuMa for Active Components

BARE DIE (Wafer process changes not covered in this section shall be handled according to section "PROCESS - WAFER PRODUCTION")											
PROCESS - ASSEMBLY											
X	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.			
X	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).			
X	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). 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).			
X	Reason for exception of tests and/or usage of generic data: Generic data used from one product of the product family (xxxx) which has highest performance out of that. 1 - not applicable, because SMD package; 2 - not applicable, because no change in Wafer Fab process; 3 - not applicable, for smart power devices only										
		Tests, which should be considered for the appropriate process change.					B				
		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: Generic data used from one product of the product family (xxxx) which has highest performance out of that. 1 - not applicable, because SMD package; 2 - not applicable, because no change in Wafer Fab process; 3 - not applicable, for smart power devices only									

8) The tests performed by the supplier should be marked with an "X" for tests at the specific device or 'G' for generic data. For tests that were not performed, please enter a numeric value (1,2,3,..) for referencing in the explanation line (see 9)).

9) Please provide a comment / explanation for each value (1,2,3,..) why certain listed tests are not performed or performed under different conditions.

Instructions how to use the DeltaQualificationMatrix (DeQuMa) Example - DeQuMa for Active Components

10) For further instructions and descriptions see sheet **Guidance** within the DeQuMa Excel File.

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 and discrete semiconductors AEC-Q101 (cell D4).
For Passive Components AEC-Q200 is used. For Optoelectronic Components the AEC-Q102 is used.
For Multi-Chip-Modules the AEC-Q104 is used. For MEMS the AEC-Q103 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 has to be done by the component manufacturer at the component only. Generic data from other relevant evaluations can be used.
"B: Board level": The intended change described in the PCN may influence handling/processability/manufacturability of the component at the customer. Therefore, additional evaluation by the customer may be necessary.
"A: Application level": The intended change described in the PCN may influence the properties of the application (e.g. ECU). 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. 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

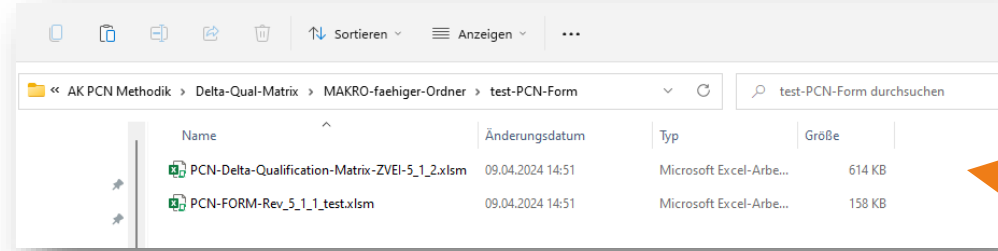
Navigation bar: Guidance | History | Active Components | Optoelectronic Components | OE-MCM | MEMS | MCM | Power Module | Passive Comp

TOP II

How to fill the PCN Form using the ZVEI - DeltaQualificationMatrix

June 2024 | DeQuMa Revision 5.1

How to fill the PCN Form using the DeltaQualificationMatrix (DeQuMa) General Information



Prerequisite: The DeQuMa file and the PCN-Template “PCN-FORM-Rev....xlsm” or your target PCN Form must be in the same document folder.

discrete semiconductors select below:		AEC-Q100 REVISION H								includes integrated	
<input type="button" value="Hide Text"/> Values: Show Rows <input type="button" value="Create PCN-Form Active"/> Values: Hide Columns											
Assessment of impact regarding following aspects - contractual agreements - technical interface of handling/processability/manufacturability of customer - form, fit, function, quality performance, reliability		Potential impact? No Yes		Understanding of semiconductors experts		Examples to explain		Further applicable conditions		Evaluation level A / B / C	
ID Type of change										A: Application level B: Boardlevel C: Component level - Not relevant for qualification matrix	
ANY DATA SHEET DESIGN											
X SEM-DE-01 Design changes in active elements (1) P P Any device relevant changes in design / layout of elements with effect on specified electrical behavior. (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)											
PROCESS - WAFER PRODUCTION											
X 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											
BARE DIE (Wafer process changes not covered in this section shall be handled according to section "PROCESS - WAFER PRODUCTION")											
PROCESS - ASSEMBLY											
X 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 NiPd/Au e.g. change of layer thickness e.g. change of external bumps of a BGA e.g. Change of external pins of a hermetic package B											
PACKING/SHIPPING EQUIPMENT TEST FLOW Q-GATE											
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.											

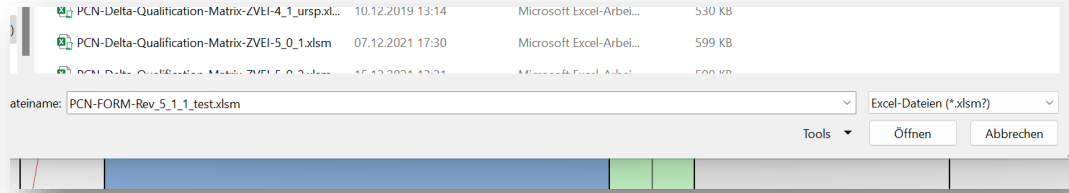
1a) Selection of all changes for the PCN in column B (see first part of the tutorial).

1b) For each sheet, an additional action button “create PCN-Form” is available. Target PCN Form will be filled with selected changes (see content in 1.4, and sections 3 & 4).

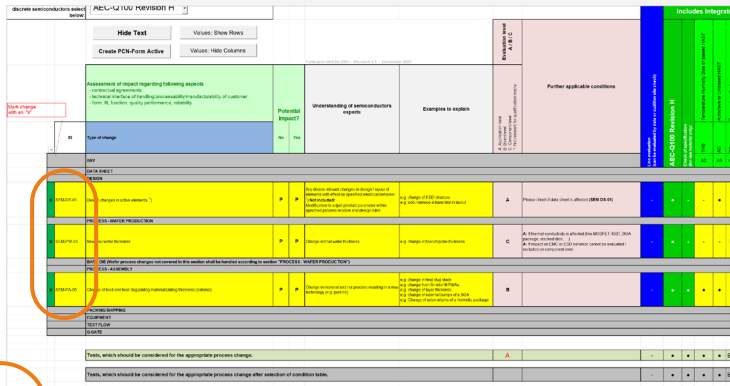
How to fill the PCN Form using the DeltaQualificationMatrix (DeQuMa)

Example – PCN Form for Active Components

2a



2a) You will be asked to enter a valid PCN Form file name. By default, the first PCN Form file found in the document folder will be used (e.g. “PCN-Form-Rev_5_1.xlsm”).



2b

No.	3.0 Ident	3.1 Category	3.2 Type of change
1	SEM-DE-01	DESIGN	Design changes in active elements. 1)
2	SEM-PW-03	PROCESS - WAFER PRODUCTION	New final wafer thickness
3	SEM-PA-05	PROCESS - ASSEMBLY	Change of lead and heat slug plating material/plating thickness (external)

Standardized information for Process/Product Change Notification (PCN)

Form provided by ZVEI - Revision 5.1

1. PCN basic data		
1.1 Company	MyCompanyName	
1.2 PCN No.	1234	
1.3 Title of PCN	Additional Information	
1.4 Product Category	Active Components – Integrated Circuits	
1.5 Issue date		
1.6 PCN revision history (optional)	1.7 Issue date of previous revision (optional)	1.8 Delta to previous revision (optional)
2. PCN Team		
2.1 Contact supplier		
2.1.1 Name		
2.1.2 Phone		
2.1.3 Email		
2.2 Team supplier (optional)		
2.2.1 Name (optional)	2.2.2 Phone (optional)	2.2.3 Email (optional)
Jim Tester	0001-1234567	me@company.com

2c

2b) Each selected change in the DeQuMa file will automatically be added to section 3 in the PCN Form.

2c) Add further information in the PCN Form in section 1, 2, 4 to 11. Finally save your file (e.g. with a new file name).

4. Description of change		
	Old	New
Change #1	Additional Information for change #1	Additional Information for change #1
Change #2	Additional Information for change #2	Additional Information for change #2
Change #3	Additional Information for change #3	Additional Information for change #3
4.1 Anticipated impact on form, fit, function, reliability or processability?		
4.2 Reference parts with customer number (optional)		

Note: You may use a pre-existing PCN Form. All existing information e.g. in section 1, 2 of the PCN Form information will be preserved.

How to fill the PCN Form using the DeltaQualificationMatrix (DeQuMa) Example Special Case – PCN Form for MCM (OE-MCM, Power Module)

PERSON					
PROCESS - ASSEMBLY - MATERIALS					
X	MCM-PA-04	Change within a sub-component that has been requalified Critical characteristics of sub-component are affected	P	P	Critical great reliab comm
PACKING/SHIPPING					
EQUIPMENT					

nts	MEMS	MCM	Passive Comp
-----	------	------------	--------------

2a

Note: Special Case MCM, OE-MCM
Only in case MCM-PA-04 (OE-MCM-PA-04) or MCM-PA-05 (OE-MCM-PA-05) is/are selected, changes in the other sheets in the DeQuMa are considered. A maximum of 20 changes can be listed in the PCN Form.

Note: Special Case Power Modules
Only in case PM-DE-05, PM-DE-06, PM-DE-07, PM-BD-09 or PM-BD-10 is/are selected, changes in the other sheets in the DeQuMa are considered. A maximum of 20 changes can be listed in the PCN Form.

2. PCN Team		
2.1 Contact supplier		
2.1.1 Name		
2.1.2 Phone		
2.1.3 Email		
2.2 Team supplier (optional)		
2.2.1 Name (optional)	2.2.2 Phone (optional)	2.2.3 Email (optional)
Jim Tester	0001-1234567	me@company.com

3. Changes			
No.	3.0 Ident	3.1 Category	3.2 Type of change
1	MCM-PA-04	PROCESS - ASSEMBLY - MATERIALS	Change within a sub-component that has been requalified Critical characteristics of sub-component are affected
2	SEM-DE-01	DESIGN	Design changes in active elements. 1)
3	SEM-PW-05	PROCESS - WAFER PRODUCTION	Change of gate material / dielectrics
4	PAS-RES-DS-02	DATA SHEET	Correction of data sheet or issue of errata

2a

4. Description of change		
	Old	New
Change #1		
Change #2	Additional Information for change #1	Additional Information for change #1
Change #3		
Change #4		
4.1 Anticipated Impact on		

2b

2a) For MCM a special case for a sub-component change (selection of MCM-PA-04 or MCM-PA-05) exists. The changes for the sub-component must be selected in the DeQuMa file as well. By executing the “Create PCN-FORM MCM” button, all changes of the MCM as well as all selected component changes in the other sheets of the DeQuMa file are added to the PCN Form file.

2b) In case of a pre-existing file the previous information are preserved.

How to fill the PCN Form using the DeltaQualificationMatrix (DeQuMa)

Example – PCN Form for Active Components

3a

ID	Type of change
	ANY
	DATA SHEET
<input checked="" type="checkbox"/>	SEM-DS-03 Specification of additional parameters
	DESIGN
<input checked="" type="checkbox"/>	SEM-DE-01 Design changes in active elements. 1)
	PROCESS - WAFER PRODUCTION
<input checked="" type="checkbox"/>	SEM-PW-03 New final wafer thickness
	BARE DIE (Wafer process changes not covered in this section shall be handled in section 4)
	PROCESS - ASSEMBLY
<input checked="" type="checkbox"/>	SEM-PA-05 Change of lead and heat slug plating material/plating thickness (external)
	PACKING/SHIPPING
	EQUIPMENT
	TEST FLOW

3b

3. Changes			
No.	3.0 Ident	3.1 Category	3.2 Type of change
1	SEM-DS-03	DATA SHEET	Specification of additional parameters
2	SEM-DE-01	DESIGN	Design changes in active elements. 1)
3	SEM-PW-03	PROCESS - WAFER PRODUCTION	New final wafer thickness
4	SEM-PA-05	PROCESS - ASSEMBLY	Change of lead and heat slug plating material/plating thickness (external)

3c

4. Description of change		
	Old	New
Change #1		
Change #2	Additional Information for change #1	Additional Information for change #1
Change #3	Additional Information for change #2	Additional Information for change #2
Change #4	Additional Information for change #3	Additional Information for change #3
4.1 Anticipated impact on form, fit, function, reliability or processability?		

3a) In case an additional change is needed in the DeQuMa, an update is possible by again executing the “Create PCN-Form ...” button and selecting the already existing PCN Form file.

3b) The new change is added to the PCN Form in section 3.

3c) In section 4 the new change is added and all previous information are preserved in the already existing PCN Form file.

Note: In case a previously selected change in the DeQuMa file is unselected the additional information ref. to this change in section 4 of the PCN Form will not be preserved after reprocessing the PCN form.

Note: Updates preserve all information in the other sections e.g. 1,2, 5 to 11.

Ansprechpartner

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