

PCN20008 (Qualification of new subcon for SOD-123, SOD-323F, SOD-523F package)
Comparison Report

Prepared by: Rolly Natividad/ Melinda Luo
Checked by: Chris Lin
Approved by: Jojo Zhang
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Reversion for: A

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Comparison Report




Following table list the difference on bill of the material used.

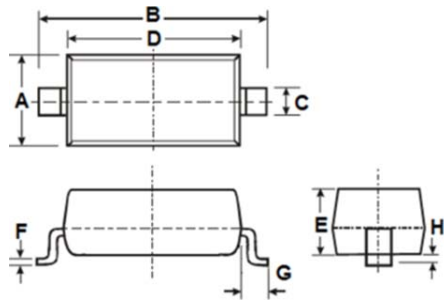
Package Type	BOM	Subcon (A)	Subcon (B)	Subcon (C)	Subcon (D)	Subcon (E)	Comment & Observation
SOD-123 (SKY)	Die Source	Dice	Dice	NA	NA	Dice	No impact on product test and reliability
	Leadframe	Cu leadframe	Cu leadframe	NA	NA	Cu Leadframe	
	Wire Type/Diameter	Cu Wire/ 1.0mil	Cu Wire/ 1.0mil	NA	NA	Cu Wire/ 1.0mil	
	D/A Epoxy	Eutectic	Eutectic	NA	NA	Eutectic	
	Mold Compound	GR640HV	GR640HV EMG-400	NA	NA	EME-500DJ	
	Plating	100% Pure Tin	100% Pure Tin	NA	NA	100% Pure Tin	
SOD-123 (SWCH)	Die Source	Dice	Dice	NA	NA	Dice	No impact on product test and reliability
	Leadframe	Cu leadframe	Cu leadframe	NA	NA	Cu Leadframe	
	Wire Type/Diameter	Cu Wire/ 1.0mil	Cu Wire/ 1.0mil	NA	NA	Cu Wire/ 1.0mil	
	D/A Epoxy	Eutectic	Eutectic	NA	NA	Eutectic	
	Mold Compound	GR640HV-L1	GR640HV-L1	NA	NA	EME-500DJ	
	Plating	100% Pure Tin	100% Pure Tin	NA	NA	100% Pure Tin	
SOD-123 (ZENER)	Die Source	Dice	Dice	NA	NA	Dice	No impact on product test and reliability
	Leadframe	Cu leadframe	Cu leadframe	NA	NA	Cu Leadframe	
	Wire Type/Diameter	Cu Wire/ 1.0mil	Cu Wire/ 1.0mil	NA	NA	Cu Wire/ 1.0mil	
	D/A Epoxy	Eutectic	Eutectic	NA	NA	Eutectic	
	Mold Compound	GR640HV-L1	GR640HV-L1	NA	NA	EME-500DJ	
	Plating	100% Pure Tin	100% Pure Tin	NA	NA	100% Pure Tin	
SOD-323F (SKY)	Die Source	NA	NA	Dice	NA	Dice	No impact on product test and reliability
	Leadframe	NA	NA	Cu leadframe	NA	Cu Leadframe	
	Wire Type/Diameter	NA	NA	Au Wire/ 1.0mil	NA	Cu Wire/ 1.0mil	
	D/A Epoxy	NA	NA	Eutectic	NA	Eutectic	
	Mold Compound	NA	NA	GR640HV-L1	NA	EME-500DJ	
	Plating	NA	NA	100% Pure Tin	NA	100% Pure Tin	
SOD-323F (SWCH)	Die Source	NA	NA	Dice	NA	Dice	No impact on product test and reliability
	Leadframe	NA	NA	Cu leadframe	NA	Cu Leadframe	
	Wire Type/Diameter	NA	NA	Au Wire/ 1.0mil	NA	Cu Wire/ 1.0mil	
	D/A Epoxy	NA	NA	Eutectic	NA	Eutectic	
	Mold Compound	NA	NA	GR640HV-L1	NA	EME-500DJ	
	Plating	NA	NA	100% Pure Tin	NA	100% Pure Tin	
SOD-523F (SKY)	Die Source	NA	NA	Dice	NA	Dice	No impact on product test and reliability
	Leadframe	NA	NA	Cu leadframe	NA	Cu Leadframe	
	Wire Type/Diameter	NA	NA	Au Wire/ 1.0mil	NA	Cu Wire/ 1.0mil CuPd/ 0.9mil	
	D/A Epoxy	NA	NA	Eutectic	NA	Eutectic	
	Mold Compound	NA	NA	GE-200 HF	NA	EME-500DJ	
	Plating	NA	NA	100% Pure Tin	NA	100% Pure Tin	
SOD-523F (ZENER)	Die Source	NA	NA	NA	Dice	Dice	No impact on product test and reliability
	Leadframe	NA	NA	NA	Cu leadframe	Cu Leadframe	
	Wire Type/Diameter	NA	NA	NA	CuPd/ 1.0mil	Cu Wire/ 1.0mil	
	D/A Epoxy	NA	NA	NA	Eutectic	Eutectic	
	Mold Compound	NA	NA	NA	ELER-8	EME-500DJ	
	Plating	NA	NA	NA	100% Pure Tin	100% Pure Tin	

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Comparison Report

Package Type: SOD-123

POD	SOD-123		TSC (SOD-123)		Items	Subcon (A)	Subcon (B)	Subcon (E)	Result	Subcon (A)	Subcon (B)	Subcon (E)
	LSL (mm)	USL (mm)	LSL (mm)	USL (mm)								
A	1.40	1.80	1.40	1.80	MAX	1.60	1.62	1.58	All meet TSC Spec.			
					AVG.	1.55	1.60	1.57				
					MIN	1.50	1.58	1.56				
B	3.55	3.85	3.55	3.85	MAX	3.75	3.75	3.70				
					AVG.	3.69	3.72	3.69				
					MIN	3.63	3.68	3.67				
C	0.45	0.70	0.45	0.70	MAX	0.60	0.55	0.58				
					AVG.	0.54	0.52	0.56				
					MIN	0.50	0.48	0.54				
D	2.55	2.85	2.55	2.85	MAX	2.70	2.74	2.67				
					AVG.	2.65	2.72	2.66				
					MIN	2.62	2.69	2.64				
E	0.95	1.35	0.95	1.35	MAX	1.20	1.20	1.10				
					AVG.	1.15	1.17	1.08				
					MIN	1.10	1.12	1.06				
F	0.05	0.15	0.05	0.15	MAX	0.07	0.13	0.11				
					AVG.	0.06	0.11	0.10				
					MIN	0.05	0.09	0.09				
G	0.50 REF		0.50 REF		MAX	0.46	0.50	0.53				
					AVG.	0.44	0.49	0.51				
					MIN	0.40	0.48	0.50				
H	-	0.10	-	0.10	MAX	0.09	0.08	0.06				
					AVG.	0.07	0.06	0.04				
					MIN	0.03	0.04	0.02				



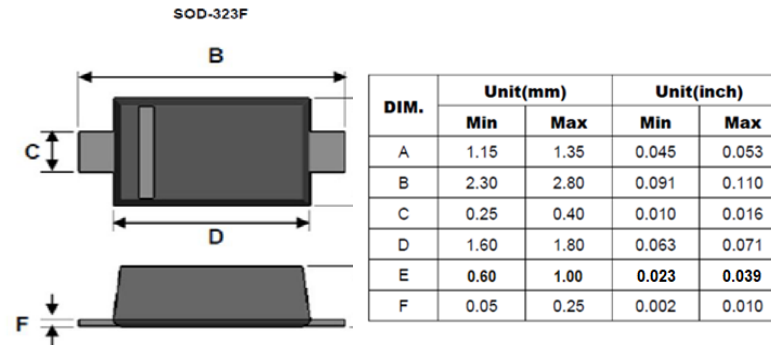
DIM.	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	1.40	1.80	0.055	0.071
B	3.55	3.85	0.140	0.152
C	0.45	0.70	0.018	0.028
D	2.55	2.85	0.100	0.112
E	0.95	1.35	0.037	0.053
F	0.05	0.15	0.002	0.006
G	0.50 REF		0.02 REF	
H	-	0.10	-	0.004

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Comparison Report

Package Type: SOD-323F

POD	EIAJ SC-90		TSC (SOD-323F)		Items	Subcon (C)	Subcon (E)	Result	Subcon (C)	Subcon (E)
	LSL (mm)	USL (mm)	LSL (mm)	USL (mm)						
A	1.15	1.35	1.15	1.35	MAX	1.35	1.27	All meet TSC Spec. "E" package height is significantly thinner compare to "C".		
					AVG.	1.29	1.25			
					MIN	1.25	1.23			
B	2.30	2.70	2.30	2.80	MAX	2.49	2.49			
					AVG.	2.46	2.45			
					MIN	2.40	2.43			
C	0.25	0.40	0.25	0.40	MAX	0.35	0.32			
					AVG.	0.29	0.31			
					MIN	0.25	0.30			
D	1.60	1.80	1.60	1.80	MAX	1.70	1.74			
					AVG.	1.66	1.72			
					MIN	1.60	1.69			
E	0.65	0.85	0.60	1.00	MAX	0.89	0.68			
					AVG.	0.86	0.65			
					MIN	0.81	0.63			
F	0.05	0.26	0.05	0.25	MAX	0.11	0.15			
					AVG.	0.11	0.13			
					MIN	0.10	0.11			



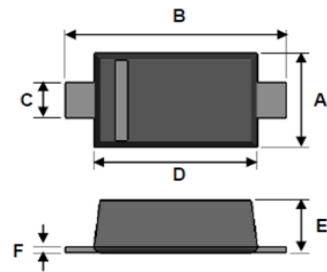
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Comparison Report

Package Type: SOD-523F

POD	EIAJ SC-79		TSC (SOD-523F)		Items	Subcon (C)	Subcon (D)	Subcon (E)	Result	Subcon (C)	Subcon (D)	Subcon (E)
	LSL (mm)	USL (mm)	LSL (mm)	USL (mm)								
A	0.70	0.90	0.70	0.90	MAX	0.84	0.81	0.84	All meet TSC Spec.			
					AVG.	0.83	0.80	0.82				
					MIN	0.82	0.79	0.81				
B	1.50	1.70	1.50	1.70	MAX	1.64	1.61	1.61				
					AVG.	1.63	1.60	1.60				
					MIN	1.62	1.60	1.60				
C	0.25	0.35	0.25	0.40	MAX	0.31	0.32	0.34				
					AVG.	0.31	0.31	0.32				
					MIN	0.30	0.30	0.30				
D	1.10	1.30	1.10	1.30	MAX	1.19	1.21	1.22				
					AVG.	1.18	1.20	1.21				
					MIN	1.17	1.20	1.20				
E	0.50	0.70	0.50	0.77	MAX	0.65	0.75	0.66				
					AVG.	0.64	0.72	0.63				
					MIN	0.63	0.71	0.59				
F	0.07	0.20	0.07	0.20	MAX	0.12	0.15	0.15				
					AVG.	0.11	0.14	0.14				
					MIN	0.11	0.14	0.14				

SOD-523F



DIM.	Unit (mm)		Unit (inch)	
	Min	Max	Min	Max
A	0.70	0.90	0.028	0.035
B	1.50	1.70	0.059	0.067
C	0.25	0.40	0.010	0.016
D	1.10	1.30	0.043	0.051
E	0.50	0.77	0.020	0.030
F	0.07	0.20	0.003	0.008

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Qualification Results (for Subcon E): Passed ZERO Failures

Item	Stress	Abrv	Sample Size	Condition	Duration	SOD-123 SKY	SOD-123 SWCH	SOD-123 ZENER	SOD-323F SKY	SOD-323F SWCH	SOD-323F ZENER	SOD-523F SKY	SOD-523F SWCH	SOD-523F ZENER
						Results: Passed	Results: Passed	Results: Passed	Results: Passed	Result: Passed	Results: Passed	Results: Passed	Results: Passed	Results: Passed
1	Pre-Conditioning MSL1	PC	308*3lots	JESD22A-113 1. Baking 125°C 24H 2. 85°C 85%RH 168H 3. Reflow 260°C 3x	192 hrs	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots	0/308*3lots
2	High Temperature Reverse Bias	HTRB	77*3lots	JESD22-A108, MIL-STD-750 M1038 Tj=Tjmax, at least 80% rated Vr	1000 hrs	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots
3	Temperature Cycling	TC	77*3lots	JESD22-A104 -55(-10/+0)°C/ 15min to 150(+15/-0)°C/ 15min	1000 cycles	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots
4	Highly Accelerated Stress Test	HAST	77*3lots	Ta=130°C, 85%RH VR=80% rated VR	96Hours	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots
5	Unbiased Highly Accelerated Stress Test	UHAST	77*3lots	Ta=130°C, 85%RH	96Hours	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots
6	Intermittent Operational Life	IOL	77*3lots	JESD22A122 Ta=25°C, ΔTj ≥100°C, 2mins ON + 2mins OFF	6000 cycles	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots	0/77*3lots
7	Resistance to Solder Heat	RSH	30*3lots	JESD22-A111 SMD, B-106 PTH Pb free: 260(+5/-0)°C	10+2-0 sec	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots	0/30*3lots
8	Solderability	SD	10*3lots	J-STD-002 JESD22-B102 245°C ± 5°C (Pb-free)	5 sec	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots
9	ESD Characterization	ESD-HBM	30*3lots	HBM JS-001 10pcs for each ESD level, (C=100pf/ R=1500Ω)	Per device each level 1(+), 1(-)zap	Cap.: 1KV	Cap.: 1KV	Cap.: 1KV	Cap.: 8KV	Cap.: 8KV	Cap.: 8KV	Cap.: 8KV	Cap.: 8KV	Cap.: 8KV
		ESD-CDM	30*3lots	CDM JS-002 10pcs for each ESD level allowed.	Per device each level 1(+), 1(-)zap	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V	Cap.: 750V
10	Destructive Physical Analysis	DPA	4*4lots	AEC-Q101-004 TC passed choose 1 lot 2pcs HAST or H3TRB passed choose 1lot 2pcs; Visual Inspection, SAM, X-ray, De-capsulation than Visual Inspection	NA	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots	0/4*3lots
11	Wire Bond Strength	WBS	10 bonds*3lots ≥ 5 parts	Per. TSC SPEC.	NA	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots
12	Wire Bond Shear	BS	10 bonds*3lots ≥ 5 parts	Per. TSC SPEC.	NA	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots	0/10*3lots
13	Die Shear	DS	5 Dice*3lots	Per. TSC SPEC.	NA	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots	0/5*3lots
14	Whisker		9*3lots	Precondition: Tj=245-260°C Temp Cycling: -55(+0/-10)°C to +85(+10/-0)°C Ambient Temp/ Humidity Storage: 30±2°C, 60±3%RH High Temp/Humidity Storage: 55±3°C · 85±3%RH	Class 1&2: TC:1500cycles ATHS:4000hrs HTHS:4000hrs	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots	0/9*3lots

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Comparison Report

● **Ordering information remove factory code :**

Before

RB751V-40WS

ORDERING INFORMATION					
PART NO.	PART NO. SUFFIX (Note 1)	PACKING CODE	PACKING CODE SUFFIX	PACKAGE	PACKING
RB751V-40WS	-xx	RR	G	SOD-323F	3,000 / 7" Reel
		R9			10,000 / 13" Reel

Note 1: Part No. Suffix "-xx" would be used for special requirement

EXAMPLE					
PREFERRED P/N	PART NO.	PART NO. SUFFIX	PACKING CODE	PACKING CODE SUFFIX	DESCRIPTION
RB751V-40WS RR	RB751V-40WS		RR		Multiple manufacture source
RB751V-40WS RRG	RB751V-40WS		RR	G	Multiple manufacture source Green compound
RB751V-40WS-B0 RRG	RB751V-40WS	-B0	RR	G	Define manufacture source Green compound

After

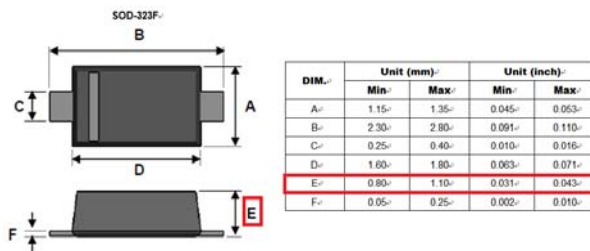
RB751V-40WS

ORDERING INFORMATION		
ORDERING CODE	PACKAGE	PACKING
RB751V-40WS RR	SOD-323F	3K / 7" Reel
RB751V-40WS RRG	SOD-323F	3K / 7" Reel
RB751V-40WS R9	SOD-323F	10K / 13" Reel
RB751V-40WS R9G	SOD-323F	10K / 13" Reel

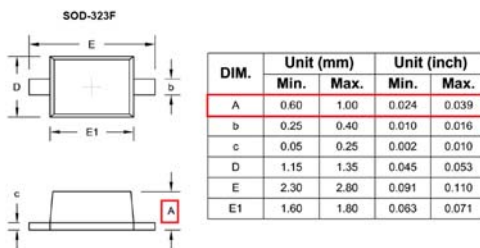
● **SOD-323F POD thickness (0.8~1.10 mm) change :**
POD thickness (0.8~1.10 mm) change to (0.6~1.0mm)

1. BAS316WS
2. BAT42WS
3. BAV19WS
4. RB751V-40WS

Before



After



● **Add test item (thermal performance)**

BAS316WS

Before

None

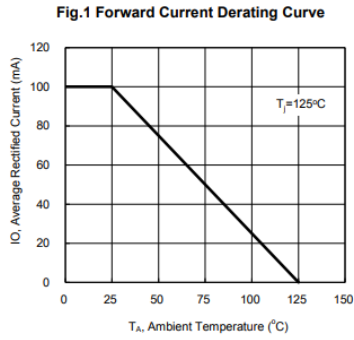
After

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	TYP	UNIT
Junction-to-ambient thermal resistance	R _{θJA}	351	°C/W

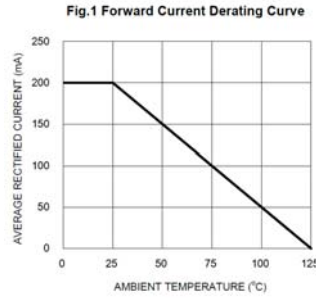
Note: Units mounted on PCB (10mm x 5mm Cu pad test board)

- **Revise forward current derating curve (IF current:200mA) :**
BAT42WS/BAT43WS

Before



After

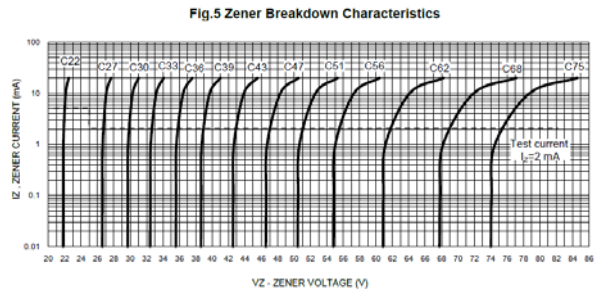
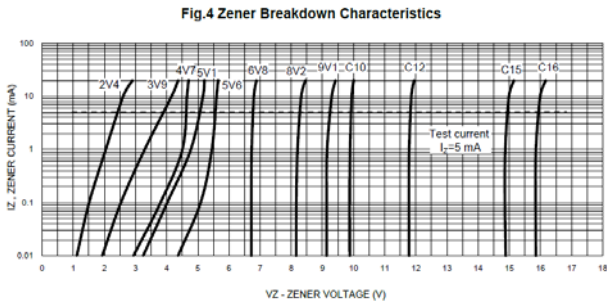


- **Add VZ@IZ curve follow test result:**

BZX584B and BZT52c series

Before
None

After



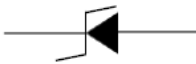
- **Add new part number in the datasheet:**
BZX584B and BZT52C series

Add new part number in the datasheet(2.4V-4.7V, 22V-75V)
BZX584B2V4 - BZX584B4V7 , BZX584B22 - BZX584B75

Add new part number in the datasheet(47V-75V)
BZT52C43-G -BZT52C75-G

- **Add positive to the circuit diagram :**
BZX584B series

Before



After



Correction datasheet Conclusion:

Editorial changes of datasheet
The change will not impact form, fit, or function of product.

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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 Bautelexperten 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 Bauelementhersteller)

- Diese Tabelle ist nur bei Änderungen anzuwenden. Neuqualifikationen und Sonderqualifikation (z.B. Verfüß von Modulen) sowie Information Notes bleiben von diesen Matrizen unberührt.
- Ist eine Änderung in dieser Tabelle nicht aufgeführt, so ist der Qualifikationsumfang zwischen Kunde und Lieferant abzustimmen.
- 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.
- 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.
- 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.
- In "Suppliers performed tests" dokumentiert der Bauelementhersteller die durchgeführten bzw. geplanten Tests.
- Falls von der Testempfehlung abgewichen wird, so sollten diese Abweichungen vom Bauelementhersteller 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 Bauelementhersteller 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 Bauelementhersteller durchgeführt. Zusätzlich ist durch den Kunden/Steuergerätehersteller die Verarbeitbarkeit zu prüfen, die z.B. abhängig von der Änderung, Zuverlässigkeitsuntersuchungen auf applikationsrelevanten Testboards 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

Information 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 DeltaQualifikationsMatrizen 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.

Form provided by ZVEI - Revision 4.1 - November 2019

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)

- 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.
- If a change is not listed in this table, the qualification plan has to be defined and agreed between customer and supplier.
- 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.
- 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".
- 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).
- In "Suppliers performed tests" the component manufacturer documents the planned and performed tests.
- 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

Information 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.

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.

