ADAU145X Product Data Sheet Revision

Item	Rev C	Rev D	Location
			Table 2, Table 3, and the top of most
	In the table headings it was incorrectly stated	Changed the IOVDD minimum range in the text	of the specification tables and many
IOVDD Minimum Range	at IOVDD = 1.8V -10%. It is really -5%.	throughout the document. IOVDD = 1.8 V – 5%	places in the Theory of Operation
		Added the specification for the DVDD regulator	
DVDD Regulator MAX	N/A	output.	Table 3, Pg 8. Table 4 Pg 10
	ViH Min and ViL Max were improperly shown		
	as the same voltage which is an error in the		
	specification. This was only shown at the	The change was to specify this over the valid range of	
	nominal voltages of 3.3V and 1.8V which is	IOVDD using an industry standard way of describing	
	also not the best way to show this	the digital levels. VoH and VoL where also changed to	
Digital Input/output Levels	specification.	be specified over the full IOVDD range.	Table 5 Pg 11.
		Added a specification for the maximum current that	
I2C Sink Current Specification	N/A	can be sunk on the I2C pins.	Table 5 Pg 11.
		Added the ON-resistance specification for the I2C pins	
I2C R-on Spec	N/A	for the four different drive strengths.	Table 5 Pg 11.
		Added the timing for the serial data output in slave	
Serial Port Output delay in slave mode		mode, Tsods, at the four different drive strengths at	
verses Drive Strengths	N/A	3.3V +/- 10%.	Table 9 Pg 14
	Tsods specification was shown to the rising		
	edge of the bit clock instead of from the falling		
	edge of the bitclock. The description in Table 8		
	was correct and the specification was correct		
	but the figure did not properly show the		
Tsods	measurement. (Figure 6, Page 10)	Correction to figure to show proper measurement	Figure 6 Pg 15
	Typo in figure 14. The crystal frequency was		
Figure 14	listed as 12.2888 MHz	Correction to 12.288 MHz.	Figure 14 Pg 31
		Added some details to the initialization routing and	
Initialization table	Table 24, Pg 26	clarified the text.	Table 27, Pg 32
		Added details about how to select a pass transistor	
Voltage Regulator Pass Transistor		and also about adding a series resistor if a ceramic	
Selection	N/A	bulk cap is used. These are applications details.	Page 40
	The bit numbers were backwards. Bit 7 is really		0
SPI address format description	bit 0 etc.	Correction to bit numbers	Table 36, Pg 47
		Removed SPDIF Receiver to Core Figure 45 An ASRC	
SPDIF Receiver to Core	SPDIF Receiver to Core, Figure 45	must be used.	N/A
Programming the SigmaDSP Core		Updated Programming the SigmaDSP Core section	
Section	Programming the SigmaDSP Core Section	Added details for applications. Added Table 60	Pages 90-91. Table 60

ADAU145X Product Data Sheet Revision

Item	Rev C	Rev D	Location
		Added the Software Value Panic registers that were	
		previously hidden. These will be used soon for added	
		features in SigmaStudio. Register addresses 0xF433	
		and 0xF434. These were also added to the register	
Software Value Registers	Table 57 pg 79	details section.	Table 61, Pg 92
		Made changes in the descriptions to reflect the recent	
		changes in SigmaStudio to fix the safeload address.	
		Backward compatibility was maintained so	
		customer's software would not have to be changed	
Software Safeload Section	Changes to and Table 62	unless they choose to.	Pg 93
		Updated Application section for Power Supply	
		regulator drawings to be consistant with the theory of	
		operation. Updated the Applications section and	
		figure 86 to show the added series resistor to the	
		DVDD bulk cap and also to fix some errors in figure 88	
		where 1uf caps were shown in error and there was	
Application section for Power Supply	Changes to Figure 86 page 177, Figure 88, pg	one cap in the drawing which should not have been in	
Regulator	178	the drawing.	Figure 86 Pg 192, Figure 88 Pg 193
		The ASRC_LOCK bit descriptions. This behavior of the	
ASRC Lock Bits	ASRC Lock Bits incorrect Table 120, Page 140	ASRCs was changed from Rev B to Rec C silicon.	Table 126, Pg 154
		Changed to divided by the Core frequency Rate.	
Table 9 for MP Pins	Error in Table 9 page 11	Slower core rate devices were added.	Table 10, Pg 15
		Deleted redundant rows of data. Consolidated	
Redundant data	Table 19, page 17	redundancies into one row.	Table 20, Pg 21
		Table 26 had the calculation of maximum instructions	
		per sample incorrect. There was an extra zero on	
		several of the system clock entries for 147.456 and	
Incorrect information in the table 26	Table 26 on page 29 incorrect.	146.7648 MHz calculations.	Table 29, Pg 36
		Corrected memory maps for the ADAU1451 and the	
	Memory Map tables had incorrect data. Table	ADAU1450. Corrected numbers for the length of DM0	
Memory Map Tables	62 and 63, Pg 83	and DM1.	Table 66 and 67, Pg 96
		The Kill Core description was not clear that the core	
		will remain killed as long as this bit is high. The	
The Kill Core Register	Kill Core Register 0xF403 description. Pg 121	decription was updated to add some functional detail	Pg 135

010	Norked on:	Daniel Tremblay, Reliability Engineer																										
(rea	Date:	25/07/2018		Form provided by ZVEI - Revision 3.1 - Deci	omber 2016																							
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	Signature:																											
For integr discrete semicor	ated circuits or iductors select	AEC-Q100 Revision H -							Inches			MAT	ERIAL PERI	ORMAN	ICE TEST F	ESULTS (or	the basis	of AEC-	Q100 Re	vision I	H)				ado	litional 1	to AEC-	
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						Evaluation leve A / B / C		ŝ		or biased HMS T		Uh	g LFe arbon, and Operato			The ski do wi	interest of the second s				4	u			(102.08)		nanged de vice Afbullion	
Mark change with an "x"		Assessment of Impact on Supply Chain regarding following aspects - contractual agreements - form, fit, function, quality performance, reliability	Remaining risks on Supply Chain?	g Understanding of semiconductors experts	Examples to explain	ation level Bevel conset level évenet for qualifostion matix	Further applicable conditions	ind by detaor autition also cho O Revision H	fication ist onty)	Temperature Humidity Bia Autoclave or Urbia sed HA	Temperature Cycling Power Temperature Cyclin	High Temperature Storage	High Temperature Operati Early Uils Failure Rate NVME Inforance, Data Rei Life	Whe Bond Shear Whe Bond Pul	Soldentality Physical Otmensions Solder Sell Shaar	Lead htag <i>tly</i> Electronignation The Depending Dailectic	Hot Camier Injection Nacitive Bies Tamperature	Stress Migration Electronic Clischiarge	Human Body Model Electronic Discharge Changed Device Model	Latch up El ectrical Dis trb ution	Characterisation El ectromagnetic Compatib	Short Chouk Charado4 zat Soft Error Rate	Lead froe HermatcPadage Test	Package Drop Lid Tonque Die Sheer	Internal Water Vapor Whisker test Officeto 006-12-82, JEDRIC J	Preservator - Acceloratio	Parameters Autopation Comparison of current with c chara derication of one chool of	Remarks
4	D	Type of change	No Ye	•		A Apple B Board C Corre		Can be with the control of the contr	Check of spoc	91 - 22 A2 - A3	21 A4 A5	N HIS	D 85 80 H 82 83	C MBP	8 8 8 2 C3 C4 C5	n 66 D1 D2	E E	- D5 1	E 8	3 B 64 E	WHO E7 E9	28 55 E10 E11	5 Horac	ao 15 80 0	7 G8			
	SEM-AN-01	Any change with impact on agreed upon contractual agreements	P P	Not relevant for technical evaluation. Any change which is not covered in the matrix								•																
	SEM-AN-02	vey compa wan impact on processability/manutacharability at customer, which is not covered in the matrix below.	P P	below, but risk assessment at customer is recommended.		В			1.1		1									1.							1	
	SEM-DS-01	UNIA BREEL Charge of datasheet parameters/electrical specification (min./max.hyp. values) and/or AC/DC specification	P P	Update of data sheet because of technical change of the product.	e e.g. recommendations for pull-up/pull-down or NC prim. NSL	A														·								
	SEM-DS-02	Conscion of data sheet / ensta	I P	No technical change of the product, only connection in description (wording, drawing,). (8): In case of editorial changes. (9): In case of impact on product integrity.	(i): e.g. correction of typo (P): e.g. datasheet correction because of new information about component behavior.	A						-																
	SEM-05-03	Specification of additional parameters	I P	Description of a new not previously covered parameter. No technical change of the product. (#): Definition of new parameter which was not documented before. (#): Not known as single change. Only in conteination with other changes.	(i); e.g. adding new lasted parameter.	A		· .	•																			
		DESIGN		1			1							11			11		1	11					11	1		
	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 translator in layout	A	Please check if data sheet is affected (SEM-DS-01).	· •			• M		• • D,,			- D C	D	D	• •	· ·		•••	• •	F			·	
	SEM-DE-02	Design changes in routing . ²)	РР	Any change of wiring between elements in chip design / layout with effect on data sheet. ²) Not included: Modification to adjust product parameter within martified feature name	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. Piezae check if data sheet is affected ISEM-DS-01.	· .	-		АМ	-						-	• •		•••	• •					•	
	SEM-DE-03	Die shrink ²)	РР	Strink of active area.	Typical shrink of die.	A	Please check if change in process technology (SEM-PW-09) is also affected.				- M		• • D.,				1	1.										
		, ,		*) Not included: saving streetkertlucribe line Integrated software by design or memory as defined by suppler. (#) Firmware modification or update without effect of landstand and modification or update without effect	(0): e.p. addition of Firmware opportunities		In case of Cu wire product please consider AEC-Q006.																					
	activities of			fo). (P): Pirmware modification or update with effect of functional performance at the conformer.	performance																							
		PROCESS - WAFER PRODUCTION					1												_									
	SEM-PW-01	New / change of wafer autostrate material	P P	New wafer material.	e.g. dimensit water material to currently initiated material (like change from EPI material into non- EPI material)	c	In case of Cu wire product please consider AEC-Q006.	- -	•			-						-		- •	• •						•	Qualification effort acc. AEC-Q100: see diffusion/doping
	SEM-PW-02	New wafer diameter	P P	Change of wafer diameter resulting in equipment and process changes.		c	Impact on changes in SEM-FW-09 and/or SEM-EQ-01.	• •			ЕM		• • •	EE				-	EE	е.							•	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	New final wafer Dickrossa	P P	Charge in final wafer thickness.	e.g. charge in final chipidie thickness	c	A: If hermal conductivity is affected (like MOSFET; IGST, BGA package, stacked dise,) A: If impact on EMC or ESD behavior cannot be evaluated / socialed on component level. In case of 0 wire product please consider AEC-Q006.	· .			E M	-	• • •	EE	· · ·			-	EE	Е.			• •				•	
	SEM-PW-04	Change of electrically active doping/implantation element	РР	Change in electrically active doping / implantation element resulting in a new technology.		A			1.1		- M	-	• # .						• •	• •	• •							
	SEM-PW-05	Change of gale material / dielectrica	P P	Change of gate material and / or gate delectric material.		A					• M		• - D,								• •						•	
	SEMPWOR	New I chance of backwide counties (window I metallization)		Change of bottom layer of die (between die and leadframe). Change in process, material, or	e a chance from CoNNULUD CoNN **-	c	A: If thermal conductivity is affected (like MOSFET; IGBT, BGA package, stacked dies,)				• •								M M	1.								AFO-2107 - Antibubia to all screet resear desires
	SEM-PW-07	new / change of metallization / vias / contacts	P P	dimensions necessary. Atemative see SEM-PW-09 Change in metalization of bondpada, material, layer thickness specifically for chip footbide and	e.g. change from ASICu to ACu	c	A: If impact on EMC or ESD behavior cannot be evaluated / excluded on component level. In case of Cu wire product please consider AEC-Q006.				• M		•								•	•						and a second sec
	SEM DIV OR	New J chance of neuroisation or dis contino (without town dot)		Change of top layer on die (between mold	a a stilling of polying?"	0	Charge of intrinaic mechanical stress might influence electrical function						. #N D															
	ale 1977 W-00		· •	compound and die). (): If the change in process technology does not	(-); e.g. change from wet to dry etching.	, i	In case of Co wire product cleane consider AEC-2006.				- M																•	
	SEM-PW-03	Change in process technology (e. g. process changes like lithography, etch, oxide deposition, dflasion, die back surface preparation/backgind,)	P	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 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.	•••	•	• •		-						•									•	Qualification effort depends on type of change.
	SEM-PW-10	Process integrity: turing within specification	P	Version within process specification (): If tuning within process specification does no influence the integrity of the final product. (P): If remaining risk on product specification is anticipated.	ol (): e.g. process control	c	Please check if DATA SHEET is affected. Please check if SEM-PW-03 is affected.	ъ	•			-						-			• •		• •				•	
	SEM-PW-11	Change of weller supplier.	P	(-): If no remaining risk in supply chain exist (P): If the change of wafer supplier can infuence the integrity of the final product.	(-): «.g. change of wafer suppler with same material composition. «.g. same metalisal composition and does not influence electrical behavior. (Φ): «.g. rew suppler with impact on substrate material and i or electrical behavior.	c	Not on component, leated on test structure (typical for IC). Interaction on component level for discride components expected. In case of SOI substrate HP properties have to be qualified. Please check if SEM-PW-01 and SEM-DS-01 is affected.	•	•									-									•	Qualification for IC & p-Controller difficult on product level. Characterisation on water level only on that structure, $B_{\rm C}=1000$, 970 band charges that incolve multiple attributes (e.g., also materials), provide the structure of the structure of product levels of the structure of work-case least vehicles to cover all the possible permutations.
	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).	с			+									-										
	SEM-PW-13	Move of all or part of water fab to a different location/site/autoontractor	РР	Wafer fab transition with additional changes (described above).	e.g. dual source / fab strategy	A	In case of Cu wire product please consider AEC-Q006.	• •		•••	• M		• • 」	•			• •	•	• •				- н	H	ı		•	AEC-Q100: "For broad changes that involve multiple attributes (e.g., sile, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case less vehicles to cover all the possible permutations."
	SEM-PW-14	Libography	P	Charge 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		• # -		•												•	

Matrix A	SEM-PW-15	Delle / Interlayer Delectric -	Р	Charge in process technique for colde / interlayer dielectic process (-): If the change in process technology does not inflamons the integrity of the final product. #): If the change in process technology can inflamon the integrity of the final product.		A	Please also check changes described under EQUIPMENT.	· •				м		#,N D,J				•	• •	•••	•	•••	•			-		-	•	
Matrix <th></th> <th>BARE DIE</th> <th></th> <th></th> <th>F 1</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>_</th> <th></th> <th></th> <th></th> <th><u> </u></th> <th>-</th> <th></th> <th></th> <th></th> <th><u> </u></th> <th></th> <th></th> <th>TT</th> <th>-</th> <th>-</th> <th></th> <th></th>		BARE DIE			F 1									_				<u> </u>	-				<u> </u>			TT	-	-		
Main and	SEM-BD-01	New final wafer thickness P	Р	Change in final wafer thickness.	Change in final chipide thickness	A	In case of Cu wire product please consider AEC-Q006.	· ·			· E	= M	•	• •	EE				•	- E	E	E •				-			•	
10 <t< td=""><td>SEM-BD-02</td><td>New / change of frontaide metalization</td><td>Р</td><td>charges, layer thickness Charges, layer thickness</td><td>e.g. change in over pad metalization</td><td>в</td><td>In case of Cu wire product please consider AEC-Q006.</td><td>· · ·</td><td></td><td>·</td><td>•••</td><td>• M</td><td>• •</td><td></td><td></td><td>•</td><td></td><td></td><td></td><td></td><td>-</td><td>• •</td><td>•</td><td>•</td><td></td><td>-</td><td></td><td>-</td><td></td><td></td></t<>	SEM-BD-02	New / change of frontaide metalization	Р	charges, layer thickness Charges, layer thickness	e.g. change in over pad metalization	в	In case of Cu wire product please consider AEC-Q006.	· · ·		·	•••	• M	• •			•					-	• •	•	•		-		-		
Matrix	SEM-BD-03	New / change of backaide metallization	Ρ	leadharre). Change in process, material, or dimensions.	e.g. change from Cr/NV/Au to Cr/NV/Ag	A		· •		1.1	•	• M	• •	· ·		••		-			-	•	• •	• •			• •	÷	•	
Matrix	SEM-BD-04	Change of wafer setup or number of possible good clies on wafer.	Р	Needed information for pick & place machine. (I): amount of possible good dies on water (P): influence on water setup and water mapping	(I): e.g. change from 350 to 240 good dies on water (P): e.g. information change for pick & place machine.	в			-									-			-					-		-	-	
3 </td <td>SEM-BD-05</td> <td>Change of optical appearance of wafer edge region (like inide coverage or edge exclusion)</td> <td>Р</td> <td>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</td> <td>(I): e.g. appearance of wafer edge (rounded initiad of square) (P): e.g. polyimide as new coating on die</td> <td>в</td> <td></td> <td>-</td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td>•</td> <td></td>	SEM-BD-05	Change of optical appearance of wafer edge region (like inide coverage or edge exclusion)	Р	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 initiad of square) (P): e.g. polyimide as new coating on die	в												-			-					-			•	
And <th< td=""><td>SEM-BD-06</td><td>Die sofbe or separation</td><td>P</td><td>Needed information for sawing and pick & place machine. (I): If the change in sawing process does not influence the integrity of the final product. (IF): In case if product is delivered on wafer</td><td>(β): 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 sealon machine.</td><td>в</td><td>Plasse check if SEM-BD-04 is affected.</td><td>• •</td><td></td><td>•</td><td>• •</td><td>• м</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td>-</td><td></td><td></td></th<>	SEM-BD-06	Die sofbe or separation	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. (IF): In case if product is delivered on wafer	(β): 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 sealon machine.	в	Plasse check if SEM-BD-04 is affected.	• •		•	• •	• м														-		-		
And a	SEM-BD-07	Die Preparation / Gean	Р	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.	(): «.g. change of cleaning time. (P): «.g. change in cleaning procedure after change of sawing equipment.	в	Please check if SEM-80-06 is affected.			•	•	- м			•••											- 1	н.	-		
Norman (N)	SEM-BD-08	New / change of passivation or die coating	р	Change of top layer on die.	e.g. addition of polyimide e.g. change of polyimide thickness	в	In case of Cu wire product please consider AEC-Q006.	• •										-								-			•	
Matrix Mat	SEM-PA-01	Change in critical dimensions of package P	Р	Charge in dimensions of existing package.	e. g. changes in package dimensions (further development).	в				•	• •	M	• •	• •		•••	т.				•			•	L H -	- 1	нн	-		
Image: Appe: Appe	SEM-PA02	Charge of leadframe base material	Р	New leadhame material in new composition	e.g. change from alloy42 to copper	в	In case of Cu wire product please consider AEC-0004					M								1.					L H .			G		
And A	SEM-PA-03	Charge in leadfarms drawnators P	Р	Change in leadhame dimensions which has impact to the specified electrical parameter acc. data wheel or approximation (e.g. head and, ph dimensions, die paddie size,) Met herdeefek - Vuoision within specification.	e. g. change between two different copper alloys t e. g. change in lead frame geometry	B	ESD investigations are only necessary if internal ground and power supply connection of leadhares is affected. At if impact on EMC behavior cannot be evaluated / excluded on component level.			-	• •	• м	• •			•••	•	• -			-			•	L Н -	-				
Matrix Matrix<	SEM-PA-04	Change of lead frame finishing material / area (internal)	Р	Change of surface material of die attach pad and accord bond area (e.g. influence in adhesion to mold compound, wedge bond reliability)	 g. change from Ag faah to NIP protection layer e. g. change from Ag spot to Au spot e. g. increase of silver plating area 	c	In case of Cu wire product please consider AEC-Q008.		•	·	• •	м	• .		- c	•		•			•				L Н -	- 1	н -			For whe bond strengh test: Pre-& Post-process change comparison to evaluate process change robustness (AEC-Q101).
	SEM-PA-05	Change of lead and heat slog plating material/plating thickness (external)	Р	Change in material and / or process resulting in a new fectors/set (a.n. race fin)	e.g. change in heat alug stack e.g. change from Sn into NiPd/Au	в				•		м	• .		- c	• .									L H -		н -			
N N	SEM-PAON	Burro Material / Metal Svatern (internal)	P	Stack de or de to substrate (fin chin)	e.g. change of layer thickness e.g. change to P5-free material	с						м													L					
And A					e.g. change of copper pillars		A: If impact on EMC behavior cannot be evaluated / excluded										-								-					
And A	SEM-PA-07	Die atlach material P	Р	Change of die attach material and / or process resulting in a new technology (e.g. soft solder, epcoy, etc.)		c	on component level (if die attach has impact on electrical conductivity). In case of Ou wire product please consider AEC-Q006.	•	•	·	•••	• M	•	• •			•	• •				•		• •	L H ·	- 1	нн	•	•	
And <td< td=""><td>SEM-PAOS</td><td>Dhange of wire bonding p</td><td>Р</td><td>Material, diameter, change in bonding diagram and / or change in process resulting in a new technology.</td><td>e.g. change from Au to Cu material e.g. change from 32µm to 23µm diameter e.g. change from single to double bond e.g. change from slich bond to slich on ball bond.</td><td>c</td><td>A: In case of bond diagram change and EMC cannot be webuilded on component level. Please also check changes described under SEM-EQ-01. In case of Cu wire bonding please consider AEC-Q006.</td><td></td><td></td><td>•</td><td>•</td><td>• •</td><td>• .</td><td></td><td> . .</td><td></td><td></td><td>• •</td><td></td><td></td><td></td><td>- м</td><td></td><td>• .</td><td>. н</td><td>-</td><td></td><td></td><td>•</td><td>Parameter Analysis: Stoldy required only for Parae devices, by general: Silas and Bit mathemia change with impact on benchprocess (e.g. from Auto Cu) recommended. AEC-2010: "We bread changes that imploit multiple athemia (e.g. sile, maternia, processar), wher is section A13 of this approxibility and action 23 of CU(0), which allows the the antiention of section-A13 of their approxibility and action 23 of CU(0), which allows the the antiention of section-A13 of their approxibility and action 23 of CU(0).</td></td<>	SEM-PAOS	Dhange of wire bonding p	Р	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 32µm to 23µm diameter e.g. change from single to double bond e.g. change from slich bond to slich on ball bond.	c	A: In case of bond diagram change and EMC cannot be webuilded on component level. Please also check changes described under SEM-EQ-01. In case of Cu wire bonding please consider AEC-Q006.			•	•	• •	• .		. .			• •				- м		• .	. н	-			•	Parameter Analysis: Stoldy required only for Parae devices, by general: Silas and Bit mathemia change with impact on benchprocess (e.g. from Auto Cu) recommended. AEC-2010: "We bread changes that imploit multiple athemia (e.g. sile, maternia, processar), wher is section A13 of this approxibility and action 23 of CU(0), which allows the the antiention of section-A13 of their approxibility and action 23 of CU(0), which allows the the antiention of section-A13 of their approxibility and action 23 of CU(0).
And a	SEM-PA-09	Rubshale / Herpower P	Р	Change of BGA substrate	e.g. charges in routing	в	A: Impact on EMC behavior cannot be evaluated / excluded on component level. A: If impact on electrical function is not excluded on component level. In case of Cu whe product please consider AEC-Q006.			•	•	м	• •				т.								ь н	- 1	нн			
And a	SEM-PA-10	Die Oversteit / Underfit -	Р	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	с		•	•	·	• •	• м	• •								-					-	. н	-		
1 </td <td>SEM-PA-11</td> <td>Dange of mole compound / encapsulation material</td> <td>P</td> <td>Charge of mold compound / encapsulation material.</td> <td>e.g. change to green mold compound e.g. change of filer particles</td> <td>в</td> <td>A: impact on themo-mechanical stress caused by mismatch of mold compound, infereconvolution bachrology and carries as which is a case of his presention system (>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>></td> <td>•</td> <td></td> <td>•</td> <td></td> <td>• M</td> <td>• •</td> <td>• .</td> <td></td> <td>•••</td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td>L</td> <td></td> <td></td> <td></td> <td></td> <td></td>	SEM-PA-11	Dange of mole compound / encapsulation material	P	Charge of mold compound / encapsulation material.	e.g. change to green mold compound e.g. change of filer particles	в	A: impact on themo-mechanical stress caused by mismatch of mold compound, infereconvolution bachrology and carries as which is a case of his presention system (>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	•		•		• M	• •	• .		•••					-				L					
11 1<	SEM-PA-12	Charge of hermitic sealing P	Р	Affected areas are material and process of hermitic (e.g. ceramic) packages, capped die and sealed devices (e.g. pressure sensors)	6 e.g. change of sealing material for RoHS	в	A: impact on EMC behavior cannot be evaluated / excluded on component level (if encapsulation / sealing has impact on electrical conductivity).	•	•		• •	•	• •													•			•	
A Participant Series and	SEM-PA-13	Change of product marking	Р	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. (#): If impact on product integrity is anticipated.	(R): e.gchange of appearance (additional marking) (P): e.gchange from inked marking to baser marking e.g. marking of pin 1	в				-						в -														
And the strept dependence of the strept dependence o	SEM-PA-14	Charge is process technology is g, sawing, die attach, bonding, molding, plating, kim and form, lead frame preparation,)	Р	(-): 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 ball bond to stitch	в	Please also check changes described under SEM-RO-01. Please check if change is described by specific type of change in this matrix.	• •		-																-		-		
Alter Alt	SEM-PA-15	Process integrity: tuning within specification -	Р	Variation within process specification (-): If suring within process specification does not influence the integrity of the final product. (P): If impact on product specification is anticipated.	(-); e.g. process control	с			-												-					-				
Market Processes Subscription Subscription <th< td=""><td>SEM-PA-16</td><td>Diarge of direct material supplier -</td><td>Р</td><td>Charge of suppliers for direct materials which are used in assembly process (BCN), (-): If charge does not influence the integrity of the final product. (P): If impact on product integrity is articipated.</td><td>(): e.g. change of wire material supplier. (P): e.g. change to new mold compound supplier e.g. additional leadhame supplier with specific leadhame manufacturing technology</td><td>с</td><td>Please check if material is changed</td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td><td></td><td>See charge of malerial.</td></th<>	SEM-PA-16	Diarge of direct material supplier -	Р	Charge of suppliers for direct materials which are used in assembly process (BCN), (-): If charge does not influence the integrity of the final product. (P): If impact on product integrity is articipated.	(): e.g. change of wire material supplier. (P): e.g. change to new mold compound supplier e.g. additional leadhame supplier with specific leadhame manufacturing technology	с	Please check if material is changed			-											-					-				See charge of malerial.
Augustual <td>SEM-PA-17</td> <td>Change of specified-assembly process sequences (deletion and/or additional process step)</td> <td>Р</td> <td>(): no influence in final product integrity or apecified aequence Φ): influence in final product integrity or apecified aequence</td> <td>(): e.g. additional cleaning step e.g. detetion of optical inspection (P): e.g. change lead finishing pre trim & form to post trim & form</td> <td>c</td> <td></td> <td>· ·</td> <td>-</td> <td>-</td> <td></td> <td>-</td> <td></td> <td>Qualification depends on specific change.</td>	SEM-PA-17	Change of specified-assembly process sequences (deletion and/or additional process step)	Р	(): no influence in final product integrity or apecified aequence Φ): influence in final product integrity or apecified aequence	(): e.g. additional cleaning step e.g. detetion of optical inspection (P): e.g. change lead finishing pre trim & form to post trim & form	c		· ·	-	-																		-		Qualification depends on specific change.
Markade Description Descripition Description	SEM-PA-18	Now of all or part of assembly to a different location/site/subcontractor.	Р	Assembly transfer or relocation	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.	•	-	•	• •	м		•	•••	•••	т.				-				L H -	- 1	нн	G	•	Whaker tests have to be done on monitoring basis! AEC-Q100: "For broad charges that involve moliphe stitubutes (e.g., site, materials, processes), refer to acclion 41.3 of this appendix and acclion 2.3 of Q100, which allows for the advector of work: case lask value labels to over all the possible premations."
Bits Properties Lines Properties Statement of Stat	SEM-PA-19	Die actibe or segaration -	Р	Separation process from single wafer to dies. (-): If the charge 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		•	-	•	•	м									-					-		-	-	
EXEMPLY: Mattery Congustom process. Law P = P = P = P = P = P = P = P = P = P	SEM-PA-20	Die Preparation / Clean -	Р	Change in process technique for die preparation / deaning (-): 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				•	•	м			•											-	н.			
	SEM-PA-21	Molding / Encapsulation process	Р	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. turing within process specification	с		•	-	•	• •	м	• •			•••	- -				-				L	-				

SEM-PS-01	Packing/shipping specification change	Р	Packing/shipping specification charge.	•					-														-						-			
SEM-PS-02	Dry pack requirements change	Р	Change of dry pack requirements (e.g. change of MSL)	•				1.1	-			-							-		-		-		-							
SEM-PS-03	Change of carrier (tray, real)	Р	Change of carrier (tray, real)	В																												
SEM-PS-04	Carge of labeling	ı.	Charge of labeling also on rest. (b) charge of material label who in repart on the processing of defined normalises which when the processing defined normalises in the processing defined normali	πp) for data B					-			-						-	-		-		-		-				-	-		
	EQUIPMENT																															
SEM-EQ-01	Production from a new equipment/lool 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	Р	Change in process technique which is not already covered above. Change from single wafer to batch pro over pad metalization) e.g. dambar cutling (mechanical to las	ns (e.g. outing)		•		-	-			-					• •		-			•			-		• •				A66	lected process change is to check.
SEM-EQ-02	Production from a new equipment/boxi which uses the same basic technology (replacement equipmen or extension of existing equipment pool) without change of process.	t	PCN required for desticated equipment for mentions composer (pockctor). (-): F drugs down on infinance the integrity of the p: F drugs down in finance the integrity of P; F drugs down product integrity is articipated.	pool ent in oven		-		-	-			-						-	-		-		-		-				-	•		
SEM-EQ-03	Change in final leat equipment type that uses a different technology.	Р	Charge of tester (only in case of bare die: final test means water test.) e.g. change tester equipment from LT Teradyne	^b C		-			-										-		-	•	-		-					•	Ga	ige R&R / delta correlation
And a second sec																																
	TEST FLOW				*																											
SEM-TF-01	TEST FLOW Move of all or part of electrical wafer test and/or final test to a different location/site/subcontractor	Р	Tester transfer or relocation. Check impact on SEM-AN-01 Dual source strategy	с		•			- 1										•			•	•		-				-	•	Ga	sge R&R / delta correlation
SEM-TF-01	TEST FLOW Move of all or part of electrical water test and/or final test to a different location/allebudocontractor O-CATE	Р	Tenter transfer or relocation. Check impact on SEM-AN-01 Dual source strategy	c		•	• •	•	•	• •		•	• •	• •	• •	• •	• •	-	·	-	•	•	·	• •	-	• •		•	•	•	Ga	ige RMR / delta correlation
SEM-TF-01	EST-AD More of at a pair of exclosed water water which the a different location blockschedule OSM Over provide the address of the pair of t	P	Taken transfer or initial ANO $$$ Que shows a sharp of the transfer of the ANO $$$ Que shows a sharp of the transfer of the ANO $$$ Que shows a sharp of the ANO $$$ Que shows a short of the ANO $$$ Que short of the ANO $$$ Qu	ner ner unermente			· ·	•	-			*	· ·					-	-	-		•	•		-				•	•	Ga Par	nge RSR / data consider. neumber /enalysis: Data consisten for Yuan for changes: EUR inconvended
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