

FORM A

GENERAL INFORMATION (PAGE 1 OF4)

GENERAL INFORMATION						
Required information						
Evaluation Type Include FORM B1, B2 or B3.	Device []	Wafer Fab [X]	Assembly, Test/Burn-in, Finish): []			
Temperature Range : Commercial [] Industrial [] Automotive [] Military [X]						
Purpose: (What is changing?) C9 4M Rad Hard Part 1. starting material changed from Std Si to EPI Si and RTA settings for RTA step are different (recipe change) 2. Metal Mask Change – MCON,M1,M2,DDLI,VIA,FOM						
Reason: (Why is it changing?) Existing C9 4M Fast ASYNC SRAM device cannot meet the Radiation spec for Military customers. To make the device Rad hard- 1. Starting material is modified 2. Mask Change (Total 6 Masks)						
Bill Of Materials :	Pkg Code :	Mold Compound :	Die Attach Epoxy:	Leadframe Material:	Leadfinish:	Wire Size/ Composition:
BOM Qualified? Yes [X], QTP No. _____ No []						
Limitations: MIL						
Division: MID				QTP Owner: NJI		
Biz Unit: ASYN				Reliability Engineer: ZIJ		
Customer Notice (PCN) Required : Yes [] No [X]						
If No, Why : New Customer						
Audit Required : Yes [] No [X] If No, Why : Determined by Rel						

I. Device Information:

Fab Device Mask Rev	Die Size (X , Y) mil	Technology	Fab Site	Defect/in ² for Technology D _o
7C1041NC	108.19, 131.42	C9FD-3R	Fab4	5.3

II. Device Option Information:

MFG-SSY Part#	MKT Part#	Nominal V _{cc}	# Pins Package Type	Base Product	METAL	PKG	BOND	FUSE	PROGRAM
7M1343NC	CY7M1043DV33	3.3V	44TSOPII, 44.4SOJ, 48BGA	YES	[]	[]	[]	[]	[]
7M1349NC	CY7M1049DV33	3.3V	44TSOPII, 36.4SOJ	No	[]	[]	[X]	[]	[]

III. Related QTP's? Yes [], No [**X**] If Yes, provide the following:

List QTP's related through rebranding:	List previous failed QTP's:
List of Package QTP 's for the Affected Package	

IV. New Technology Qual? Yes [], No [**X**] If Yes, provide the following:

NTP, ETP or FTR Documentation: Spec #	Wafer Level Reliability Data: Memo log #
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FORM A**GENERAL INFORMATION (PAGE 2 OF4)****V. New Device Qual? Yes [], No [X] If Yes, provide the following:**

Smaller Device (Part Number, Technology, Die Size, QTP number, Status):	Larger Device (Part Number, Technology, Die Size, QTP, Status):
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VI. Fab or Assembly Process Change? Yes [X], No [] If Yes, provide the following:

Fab Process Change Review (PCR) Documentation: Memo log #001-64295	Assembly Process Change Review (PCR) Documentation: Memo log #
Fab or Assembly Process Qual by Extension: Attach extension checklist	Test Process Change Review (PCR) Documentation for Test Reduction Qual: ECN#:

VII. Mask Change Qual? Yes [X], No [] If Yes, provide the following:

Design Change Description: Attached Document Memo log # VXS#182	Minor Design Change (Yes/No): If yes, Memo log#
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VIII. Manufacturing Flow

Sort Location: Fab4 Platform: VT4108, VT3308 Program Name(s): NM11D041N9, OE21C041N, NB31D041N, NB41D041N Temperature: -40C, 100C, 100C,150C	Burn-in Location: Sempac, Go Duration: 24 Hrs Vcc Voltage: 4.5V Temperature: 150C
Class Location: R, GO Platform: Advantest Program Name(s): CHC341N, CRC341N Temperature:105C, 24C	QA Location: GO Platform: Advantest Program Name(s): QAC341N Temperature:24C
Planned Qualification Flow if different from above	24Hrs BI>CHI(125C) > CLI(-45C) > EFR(48Hr) > FQAS(24C)>FQAS1(125C)>FQAS2(-45C)

IX. More Than One Package? Yes [], No [X] If Yes, provide the following:

CDM required for each package option: List of Packages	HBM and Latch-up required for each bond option:
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FORM A

GENERAL INFORMATION (PAGE 3 OF4)

X. New Package Qual? Yes [], No [X] If Yes, provide the following:

PDR 1 – 3 Completed? Memo log #	BE-PCR Approved? Memo log #	FMEA Review? : Spec #
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XI. Package QTP Coverage Range

Assy Site	Package Outline	Package	Lead	Die Size	Paddle	Lead Frame Design	Fab Tech.	Min. Bond Pad Opening
		Not Applicable						

XII. Manufacturing Process Readiness:

Information Available (Yes / No)	Yes (provide spec no.)	No (provide date)
Bond Diagram	TBD	
Assembly Process	49-35031	
Package Outline Drawing	51-85087	
On-line OBOM	TBD	
On-line Subcon Baseline Spec	49-25026	
Tube/Tray Drawing and Qualification	NA	
Carrier Tape and Cover Tape Qualification	NA	

XIII. Specification GAP Analysis (JEDEC, Military Standard , 12-00292 & POD)

Comparative Analysis must be provided

Subcon Spec Gap Analysis	Is Subcon Aligned with 12 -00292 Spec ?	Yes []	No []
	Note : All reference spec under this spec must be reviewed.		
Package Outline Drawing	Is POD aligned with 12-00292 , Jedec & Military Stds ?	Yes []	No []

XIV. Package , Techonology & Fab Information:

Package Information		Technology / Fab Information	
Mold Compound Flammability Rating		Number of Metal Layers :	2
Mold Compound Glass Temperature (Tg)		Metal Composition:	
Mold Compound Alpha Emission Rate		Metal 1 :	100Å Ti/ 3200Å Al/ 300Å TiW
Mold Compound Flammability Rating		Metal 2 :	150Å Ti/ 8000Å Al/ 300Å TiW
Oxygen Rating Index: >28%		Metal 3 :	
Lead Frame Designation/Supplier		Metal 4 :	
Reduced Metal Pad []		Passivation Type & Materials	Oxide TEOS/ Nitride
Full Metal Pad []		Passivation Thickness	Oxide- 1000Å,Nitride-9000Å
Lead /Solder Finish Composition & Thickness		Number of Transistors in Device	
Leadframe Material		Number of Gates in Device	
Substrate Material Designation/ Supplier		Gate Oxide Material	
Solder Ball Designation	Pitch :	Gate Oxide Thickness	
	Diameter :	Generic Process Tech./ Design Rule	C9FD-3R
	Copper Trace	Name of Die Fab Facility	Fab-4
	Spacing :	Name & Location of Die Fab Facility	Fab-4/CMI
Die Backside Preparation Method		Die Fab Line ID	7C1041NC
Die Separation Method		Wafer Process ID	
Die Attach Material / Supplier			
Bond Diagram Designation			
Wire Bond Method	BALL BOND		
Wire Material / Size/ Supplier	Au/0.9		

Thermal Resistance Theta JA (C/W)	71.53		
Package Cross Section:	Yes [] No []		
Assembly Process Flow	11-20047		
Assembly Location & Code	CML-R, ASE-G		

FORM A

GENERAL INFORMATION (PAGE 4 OF4)

XV. Stress Conditions

Stress	Vcc (V)	Temp (C)	RH (%)	Other	Duration
Moisture Preconditioning		Temp Cycle Condition :		Reflow Temp:	
MSL1 []	N/A	***Cond G (-40C / +125C) []	N/A	220 C []	192 Hrs []
MSL3 [X]		Cond C (-65 C / +150C) [X]		235 C []	168 Hrs []
Others []		***Cond B (-55 C / +125C) []		260 C []	Others []
EFR / LFR / LLV Reg-Off	115% of Vcc Nom: 3.77V	125 C [] 150 C [X]	NA	N/A	48 Hrs [X] 96 Hrs [] Others []
LTOL	130% of Vcc Nom:	-30 []		N/A	168 Hrs [] 500 Hrs [] 1000 Hrs []
EFR Reg-On	120% of Vcc Nom:	125 C [] 150 C []		N/A	48 Hrs [] 96 Hrs [] Others []
HTSSL	110% of Vcc Nom:	125 C [] 150 C []		N/A	48 Hrs [] 96 Hrs [] 1000 Hrs []
HAST *	110% of Vcc Nom:	110 C [] 130 C []	85% [] Others []	Power Cycling Yes [] No []	96 Hrs [] 128 Hrs [] 256 Hrs [] 264 Hrs []
THB	110% of Vcc Nom:	85 []	85% [] Others []	N/A	168 Hrs [] 500 Hrs [] 1000 Hrs []
Temp Cycle	NA	***Cond G (-40C / +125C) [] Cond C (-65 C / +150C) [X] ***Cond B (-55 C / +125C) []	N/A	N/A	300 cycles [] 500 cycles [X] 1000 cycles []
PCT	N/A	121C []	100% [] Others []	N/A	96 Hrs [] 168 Hrs [] 288 Hrs []
HTS	N/A	150 C [] 165 C []	N/A	N/A	500 Hrs [] 1000 Hrs []
Thermal Shock	NA	Cond B (-55C / +125C) [] Others []	N/A	N/A	200 cycles [] 1000 cycles []

HAST – Mold compound Tg must be > 130C. Otherwise use THB. BGA package must use 110C HAST if Cu trace space >0.4mm. Otherwise use THB.

FORM B1

WAFER FAB PROCESS & DEVICE CATEGORIES

Wafer Fab Process		Device	
Commercial [], Military <input checked="" type="checkbox"/> , Commercial & Military [], Automotive [], Commercial & Automotive []		Commercial [], Industrial [], Military <input checked="" type="checkbox"/> , Automotive []	
New		New	
1. New Process Core (a), both Commercial & Military		1. Larger Die Area or Density of qualified Device	
2. New Process Core (a), Commercial only		2. Military Device	
3. New Process Derivative		3. Chop of qualified Device	
4. New Fab Site (Audit is required)		4. Same or Smaller Die Area or Density of qualified Device	
5. Shrink		5. New Device via Metal option of qualified device: same as #4	
6. New Memory Cell		6. New Device via Mask change of qualified device: same as #4	
7. New Transistor Design		7. Qualify by extension	
8. Equipment		8. Automotive Device	
Change		Change	
1. MAJOR CHANGES TO THE PROCESS FLOW a. add, move, or change the order to major process steps		1. All layers mask change to an existing device. Does the current data sheet need to be revised? yes, no	
<input checked="" type="checkbox"/> 2. STARTING MATERIAL a. any change in vendor or incoming wafer spec such as diameter, composition, structure, or composition		2. Non-Metal Mask Does the current data sheet need to be revised? yes, no	
3. DIELECTRIC MATERIALS a. change in film thickness or composition beyond the objective spec b. new deposition method	<input checked="" type="checkbox"/>	3. Metal Mask (Minor) Does the current data sheet need to be revised? No	
4. METAL DEPOSITION a. change in sputter target vendor or specification b. change in deposition sequence c. >10% change in any recipe parameter		4. Metal Mask (Non-Minor) Does the current data sheet need to be revised? yes, no	
5. CONTACT AND VIA a. any change in clean etch/clean sequence b. > 10% change in any etch or clean recipe parameter			
6. PASSIVATION a. change in materials, deposition sequence, technique or equipment type b. change in thickness or composition beyond objective specification			
7. NEW EQUIPMENT a. new model or vendor			
8. PAD MASK ETCH a. any change in clean etch/clean sequence b. > 10% change in any etch or clean recipe parameter			
9. DIFFUSION / DOPING a. Change in dopant methodology or change in dopant species			
10. GATE a. change in gate CD or gate stack thickness or composition target beyond the objective spec b. change in deposition, etch, or clean method			
11. ISOLATION a. change in materials or thickness, beyond the objective spec b. change in deposition, etch, cleans methods			
12. PHOTO RESIST a. change in the photo resist b. > 10% change in thickness			
Transfer		Transfer	
1. Transfer Qualified Wafer fab process to new Fab site		1. Transfer Qualified Device to new Fab site	
Misc		Misc	
1. Manufacturability Qual for New Fab Transfer and New Technology		1. Relax the data sheet limits	
2. Additional package option (qualified device)		2. Programming algorithm modifications	
3. Additional bond option (qualified device)		3. Relaxation of ESD sensitivity	

Notes:

- First "New design" may drive wafer fab process qual
- Gate Oxide, Oxide deposition, Implants, Diffusion, RTA, Etch, Lithography, etc
Audit required? No ☒ , Yes []. If Audit is required, is Audit memo submitted? No [], Yes []
If No Audit memo, who will be the Auditor?

FORM C

QTP Test Requirements (Stress/ tests to be conducted: Refer to TABLE 3A-3V)

Qualification Test Plan # _____													
QTP Owner's Initials: <u> NJI </u> Table used: <u> 3B & 3E </u> Category : <u> Starting Material & Metal Mask(Non Minor) </u>													
Test #	Stress or Test	Test To be performed by (Initial/Site)	Cost per Stress/ TV	TEST VEHICLES						Cond Qual Readout	Full Qual Readout	<Required Readouts > {Robustness}	Subtotal
				TV1	TV2	TV3	TV4	TV5	TV6				
				Fab	Fab	Fab	Fab	Fab	Fab				
				S.S. (P,F)	S.S. (P,F)	S.S. (P,F)	S.S. (P,F)	S.S. (P,F)	S.S. (P,F)				
6A	ESD- HBM	QOO/C ML		14(0,1)									
6B	ESD- CDM	QOO/C ML		15(0,1)									
12	Temp Cycle (Information Only)	QOO/C ML		77(0,1)									
22E	EFR	QOO/C ML		1500	1500								
33	Static Latch Up	QOO/C ML		9(0,1)									
65a	Etest	CMI		X	X								
65b	Sort Yield	NJI/CMI		X	X								
65c	Class Yield	NJI/CMI		X	X								
												Total Cost	

Does this test plan use minimum sample sizes and test durations? [☐] YES [☐] NO

Does this test plan conform to the requirements of Table II for Device or Table III for Package ? [☐] YES, [☐] NO

FORM D

RELIABILITY LAB TOOL READINESS

1 Reliability Lab Verification

CML Initial / Signature: _____ / _____

CSJ Initial / Signature: _____ / _____

	Yes	No	
1. For ESD and Latch-Up Tests:			
• Are ESD and Latch-Up Tests sockets available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	QTP owner to provide. When : _____
• Is the package height (package + pin) less than 9.78mm?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	CDM must be run off site, not on the RCDM2
2. For HAST Stress:			
• Is HAST board available?	<input type="checkbox"/>	<input type="checkbox"/>	QTP to provide. When : _____
• Is HAST board for device options covered by this qualification available?	<input type="checkbox"/>	<input type="checkbox"/>	QTP Owner to provide. When : _____
• Is HAST Bias Diagram already on-line? If Yes, provide reference : Table _____ of BI Spec# _____.	<input type="checkbox"/>	<input type="checkbox"/>	PE to revise applicable BI spec. When : _____
• Is HAST Bias Diagram for device/package options covered by this qualification already on-line? If Yes, provide reference :	<input type="checkbox"/>	<input type="checkbox"/>	PE to revise applicable BI spec. When : _____
• Is the T _g of mold compound above 130°C? Note: HAST CURRENT WILL BE MEASURED BY PE FOR NEW DEVICE QUAL. Mold compound T _g should be at least 130°C for HAST, otherwise 1000 hrs THB shall be done.	<input type="checkbox"/>	<input type="checkbox"/>	Mold compound T _g : _____ °C
• Is HAST program for device/package options already available? For PSOC and USB Devices Only	<input type="checkbox"/>	<input type="checkbox"/>	PE to provide applicable HAST Program When : _____
3. For EFR/LFR Stress:			
• Is BIB available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	QTP Owner to provide. When : _____
• Is BIB for device/package options covered by this qualification available?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	QTP Owner to provide. When : _____
• Is EFR/LFR Bias Diagram already on-line? If Yes, provide reference : Table _ Appendi-16_ of BI Spec# _001-06234_.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PE to revise applicable BI spec. When : _____
• Is EFR/LFR Bias Diagram for device/package options covered by this qualification already on-line? If Yes, provide reference : .	<input checked="" type="checkbox"/>	<input type="checkbox"/>	PE to revise applicable BI spec. When : _____
• Is EFR/LFR program for device/package options already available? For PSOC and USB Devices Only.	<input type="checkbox"/>	<input type="checkbox"/>	PE to provide EFR/LFR program When : _____
• For new devices: Is BI Set-up qualification (29-00023) passed Electrical Test? If yes, provide reference memolog.	<input type="checkbox"/>	<input type="checkbox"/>	PE to provide. When : _____
4. For HTSSL Stress:			
• Is BIB available?	<input type="checkbox"/>	<input type="checkbox"/>	QTP Owner to provide. When : _____
• Is HTSSL Bias Diagram already on-line? If Yes, provide reference : Table _____ of BI Spec# _____.	<input type="checkbox"/>	<input type="checkbox"/>	PE to revise applicable BI spec. When : _____
5. For DRET/Endurance Stress (Programmable Device):			
• Is DRET/Endurance program available? If Yes, provide:	<input type="checkbox"/>	<input type="checkbox"/>	PE to provide. When : _____
• Is DRET/Endurance program for device option available? If Yes, provide program list:	<input type="checkbox"/>	<input type="checkbox"/>	PE to provide. When : _____

FORM E

FAILURE ANALYSIS LAB READINESS

Device and Technology Qualification Test Plan – FA & Rel Lab Tools

1. Failure Analysis Verification

Initial / Signature: _____ / _____

Product Engineering Verification

Initial / Signature: _____ / _____

FA manager that will sign this section is responsible for checking both CSJ and CML FA sites.

	<u>CML</u>			<u>CSJ</u>		
	Yes	No	If No,	Yes	No	If No,
1. For MID Devices:						
• Is ATE bitmap available for your product?	[X]	[]	PE to provide. When : _____	[]	[]	PE to provide. When : _____
• If Yes, has it been verified to correlate with physical bitmap?	[X]	[]	PE to perform bitmap correlation. When : _____	[]	[]	PE to perform bitmap correlation. When : _____
• Socket for MOSAID tester:	[X]	[]	PE to provide. When : _____	[]	[]	PE to provide. When : _____
2. For non-MID devices:						
• Is ATE bitmap applicable?	[]	[]	PE to provide. When : _____	[]	[]	PE to provide. When : _____
• If Yes, has it been verified to correlate with physical bitmap?	[]	[]	PE to perform bitmap correlation. When : _____	[]	[]	PE to perform bitmap correlation. When : _____
• If No, is OSC-50 or LCT tester available for your product?	[]	[]		[]	[]	
• Bench capability for simulation of functional test block?	[]	[]		[]	[]	
3. Bench Socket Card Availability	[X]	[]	QTP Owner or PE to provide. When : _____	[]	[]	PE to provide. When : _____
4. Decapsulation Capability	[X]	[]	QTP Owner or PE to provide. When : _____	[]	[]	PE to provide. When : _____
5. C-SAM Tray Availability	[X]	[]	QTP owner to provide. When : _____	[]	[]	QTP owner to provide. When : _____

Note: GOOD UNITS MUST BE SUBMITTED TO FA GROUP FOR CORRELATION.