PRODUCT/PROCESS CHANGE NOTIFICATION

PCN APM/07/3016
Notification Date 11/30/2007

NEW B/E LOCATION FOR VFDFPN/VFQFPN Packages for IMS

APM - APM

Table 1. Change Implementation Schedule

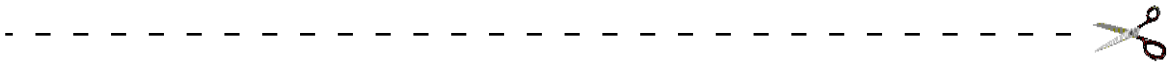
Forecasted implementation date for change	15-Jan-2008
Forecasted availabillity date of samples for customer	23-Nov-2007
Forecasted date for **STMicroelectronics** change Qualification Plan results availability	23-Nov-2007
Estimated date of changed product first shipment (according to JEDEC standard JESD46C 'customer Notification of product/process change by semiconductor suppliers')	29-Feb-2008

Table 2. Change Identification

Product Identification (Product Family/Commercial Product)	See attached list
Type of change	Package assembly location change
Reason for change	Service improvement and Back End capacity extension
Description of the change	A new VFDFPN and VFQFPN Assembly/Testing line has been installed in STMicroelectronics Back End plant (Muar Malaysia) for IMS group. This new line will increase production capacity in order to satisfy our Customers demand. No change in Electrical & mechanical characteristics for the relevant devices. Lead frame is Ni/Pd/Au Qualification Reports here attached are referred as follow: (QAQFN91) related STD Linear products. (REL-6043-290.07W) related Voltage Regulators products (MMS-MCD_QA07-013) related MCD products
Product Line(s) and/or Part Number(s)	See attached
Description of the Qualification Plan	See attached
Change Product Identification	Plant code "99" on label trace code
Manufacturing Location(s)	

Table 3. List of Attachments

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt	**PCN APM/07/3016**
Please sign and return to STMicroelectronics Sales Office	**Notification Date 11/30/2007**

☐ Qualification Plan Denied	Name:
☐ Qualification Plan Approved	Title:
	Company:
☐ Change Denied	Date:
☐ Change Approved	Signature:

Remark

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DOCUMENT APPROVAL

Name	Function
Benmokhtar, Youssef B	Division Marketing Manager
Fong, Steven	Division Marketing Manager
Gilot, Yves	Division Marketing Manager
San biagio, Marcello	Division Marketing Manager
Kaire, Jean-Claude	Division Product Manager
Naso, Lorenzo	Division Product Manager
Nicholas, Jimmy Edward	Division Product Manager
Russo, Biagio	Division Product Manager
De mingo, Francisco	Division Q.A. Manager
Paccard, Francoise	Division Q.A. Manager
Vitali, Gian Luigi	Division Q.A. Manager

PROCESS CHANGE / TRANSFER QUALIFICATION REPORT

Qualification Report n°: QAQFN91

Qualification Type: Additional capacity for QFN

Date of issue: 24th October 2007

Reference documents:

SOP 2.5.9 Process critical and key parameters
0076604 Process Qualification and release to production
0078588 Reliability requirements for product qualification
0046008 Process control plan for Front End
0060531 FMEA procedure
0061050 Back end qualification procedure
0091984 Construction analysis
0037709 Package construction analysis
7006451 Management of manufacturing source change
0033689 Process flow chart

Content

1. PROCESS MAIN SPECIFICATION CHANGE

1.1 Process change description.

1.1.1 Nature of Change: New QFN line in ST Muar (Malaysia)
1.1.2 Reason for Change: Additional capacity
1.1.3 Affected process: QFN 3x3
1.1.4 Affected products: TS4990IQT
1.1.5 Implementation date: November 2007

1.2 DETAILLED DESCRIPTION OF CHANGE

Assembly change

	Current process	Modified process	Recommended test
Assembly location	Carsem (Malaysia)	ST Muar (Malaysia)	POA verification Construction analysis Rohs compliance
Die attach	CRM1076-DJ	QMI519	TMC, PPT, Electrical distribution
Wire	Gold 1 mils	Gold 0.8 mils	Electrical distribution on 500units
Leadframe	Copper 63x103mils and 75x104mils for 3x3 QFN 106x106 for QFN 4x4 41x69 for 2x2	Copper Hitachi PPF	Precon J1, TMC,PPT,
Molding compound	SUMITOMO EME 7730 LF	Sumitomo EME – G770HCD	Precon J1, TMC,PPT, HTB, THB
Lead finishing	Sn	NiPdAu	Solderability

Test change

	Current process	Modified process	Recommended test
Test location	Carsem Malaysia	ST Muar	
Tester type	ASL 1000	ASL 3000	
Handler type			

Finishing

	Current process	Modified process	Recommended test
Finishing location	Carsem Malaysia	ST Muar	
Reel size	13 inches	13 inches	Dimensional verification
Tape width	mm	mm	Dimensional verification Material verification

1.3 Risk assessment

Type of risk Q: Quality E: Electrical R: Reliability	Parameter	Possible effect	Qualification check
E	All	Parameter drift	Drift during THB final test yield check
R	MSL	MSL degradation	Preconditioning + TMC,PPT
Q	POA, solderability	POA change, Solderability degradation Finishing specificatrion	Construction analysis including solderability test T&R CA

2. QUALIFICATION PLAN

2.1 Test vehicle description

	TV1
Line	Q990
BU	Stdl
Sales Type	TS4990IQT
FE process	HF4CMOS
Package	DFN8 3x3
Die size (µm)	1460x2120
Die thickness (µm)	280
Metallization	AlSiCu
Passivation	Pvapox+Nitride
Back side	Silicon

2.2 Assembly, Final Test and Finishing qualification requirements

	TV1
Quantity of qualification lot	1
Package type	DFN8 3x3
Lot average yield	X
Parameters distribution	X
List of parameters	All
Drift versus EWS analysis	
Test capability	X
Construction analysis	X*
Packing qualification	X

Note: in **bold** minimum data required before sending the PCN
*workability report

2.3 ESD and Reliability qualification requirements.

Tests	Conditions	Step	TV1	Comments
ESD	HBM			
ESD	CDM			
ESD	MM			
HTB	Tj=150C Vs=absolute max rating		Ta=	
		168h 1000h		
OLT	Tj=150C Vs=Max operating	168h 1000h		
THB	Ta=85C RH=85% Vs=nominal	168h 1000h	78 78	
TMC	Ta=-65/+150C	100cy 500cy 1000cy	78 78 78	
PPT	Ta=121C P=2atm	168h 240h	78 78	
Env seq	TMC + PPT	100cy 96h		
Jedec Level	Baking (150℃) Moisture soak 3 IR reflow soldering	24h Jedec T ℃	15	
TMSK	Ta=-65/+150C	100sh 500sh		

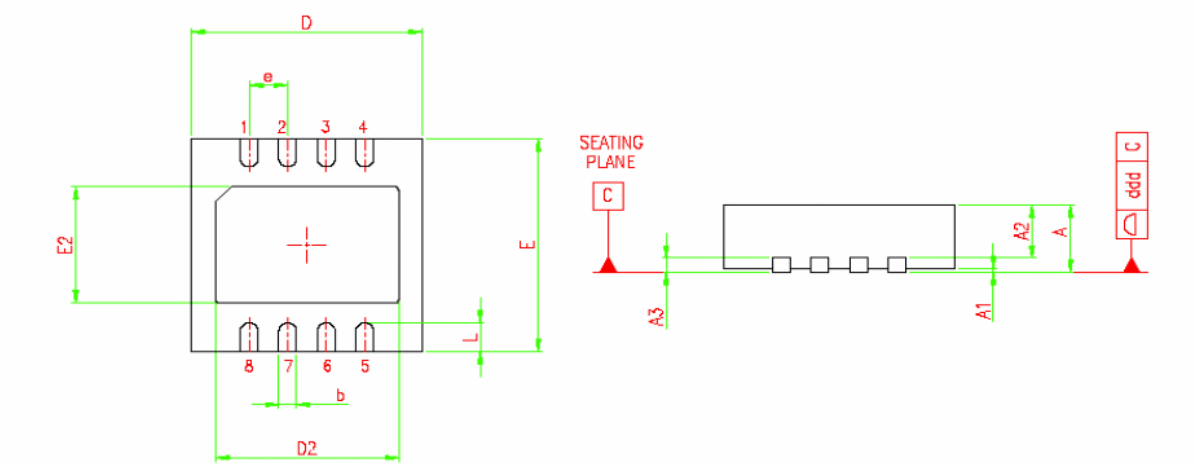
Note: in **bold** minimum data required before sending the PCN
- o Drift analysis [X] yes [] no
- o Reliability monitoring change [] yes [] no

2.4 Documentation

LIST OF IMPACTED DOCUMENT (If any):		
#	**Title**	**Reference**
	BSA	CD00164019
	TFI	CD00172812
	MBD	8069181
	FCA/control plan	8066659
	FMEA Wafer mounting Wafer sawing Glue die attach Glue curing Plasma cleaning Wire bonding Molding Post mold cure Deflashing Marking Package singulation	 7124074, 7049670, 7124074 7046573 7046574 7046575 7656564 7046576 8063092 7141449 8042535 8063116 8042532
	BOM	1F019209

2.5 Assembly and FT qualification results

	TV1
Quantity of qualification lot	1
Package type	DFN8 3x3
Lot average yield	98.01
Construction analysis	See below summary
Packing qualification	Conform to ST specification



Dimensions	Specification			Data										Min	Max	Mean	Stdev	Cpk
items	min.	Typ	max.	1	2	3	4	5	6	7	8	9	10					
A: Pkg thickness (total)	0.800	0.900	1.000	0.938	0.934	0.935	0.938	0.929	0.934	0.930	0.932	0.947	0.940	0.929	0.947	0.936	0.005	4.03
A1 : stand-off	0.000	0.020	0.050	0.023	0.016	0.020	0.022	0.013	0.019	0.016	0.016	0.018	0.011	0.011	0.023	0.017	0.004	1.54
A3: lead thickness	-	0.200	-	0.239	0.238	0.239	0.235	0.227	0.235	0.231	0.240	0.236	0.229	0.227	0.240	0.235	0.005	2.58
b: lead width	0.180	0.250	0.300	0.266	0.264	0.260	0.262	0.270	0.268	0.266	0.269	0.270	0.268	0.260	0.270	0.266	0.003	3.30
D : pkg length (total)	2.850	3.000	3.150	2.989	2.997	3.003	3.003	3.001	3.000	2.998	2.997	2.998	2.991	2.989	3.003	2.998	0.005	10.60
D2: exposed pad	2.230	-	2.480	2.384	2.389	2.386	2.383	2.389	2.391	2.389	2.384	2.392	2.398	2.383	2.398	2.389	0.005	6.70
E : pkg width (total)	2.850	3.000	3.150	2.998	2.994	2.989	3.005	3.002	3.002	3.006	2.986	2.996	2.991	2.986	3.006	2.997	0.007	7.11
E2: exposed pad	1.490	1.640	1.740	1.632	1.633	1.629	1.638	1.633	1.638	1.629	1.636	1.632	1.629	1.629	1.638	1.633	0.003	13.69
e: lead pitch	0.475	0.500	0.525	0.501	0.503	0.501	0.499	0.501	0.502	0.501	0.502	0.502	0.501	0.499	0.503	0.501	0.001	7.46
L: lead length	0.300	0.400	0.500	0.364	0.357	0.371	0.369	0.373	0.368	0.373	0.355	0.378	0.367	0.355	0.378	0.368	0.007	3.13
L: lead length (id side)	0.300	0.400	0.500	0.434	0.446	0.414	0.446	0.448	0.426	0.445	0.412	0.430	0.435	0.412	0.448	0.434	0.013	1.68
ddd: coplanarity	-	-	0.080	0.009	0.007	0.010	0.007	0.008	0.009	0.006	0.008	0.007	0.010	0.006	0.010	0.008	0.001	17.49

2.6 ESD and Reliability qualification results

Tests	Conditions	Step	TV1	Comments
HTB	Tj=150C Vs=absolute max rating		Ta=	
		168h 1000h		
OLT	Tj=150C Vs=Max operating	168h 1000h		
THB	Ta=85C RH=85% Vs=nominal	168h 1000h	0/78 0/78	
TMC	Ta=-65/+150C	100cy 500cy 1000cy	0/78 0/78 0/78	
PPT	Ta=121C P=2atm	168h 240h	0/78 0/78	
Jedec Level	Baking (150℃) Moisture soak 3 IR reflow soldering	24h Jedec T ℃	0/15	

Conclusion: Package QFN 3x3 in ST Muar is qualified for Standard linear Ic's

1.1 Process change description.

1.1.1 Nature of Change: New DFN/QFN line in ST Muar (Malaysia)
1.1.2 Reason for Change: Additional capacity
1.1.3 Affected process: QFN
1.1.4 VR&I test vehicle: ST1S06
1.1.5 Implementation date: JAN 2008

1.2 DETAILLED DESCRIPTION OF CHANGE

Assembly change

	Current process	Modified process	NOTE
Assembly location	Carsem (Malaysia)	ST Muar (Malaysia)	
Die attach	QMI519	QMI519	
Wire	Gold 1 mils	Gold 1 mils	
Leadframe	Copper + Ag spot	Copper PPF	
Molding compound	EME G770HCD	EME G770HCD	
Lead finishing	Sn	NiPdAu	

Test change

	Current process	Modified process	Note
Test location	Carsem Malaysia	ST Muar	
Tester type	ASL 1000	ASL 1000	
Handler type			

Finishing

	Current process	Modified process	Note
Finishing location	Carsem Malaysia	ST Muar	
Reel size	13 inches	13 inches	
Tape width	mm	mm	

IMS (Industrial & Multisegment Sector)
APM (Analog, Power,MEMS) Group
Voltage Regulator, Interface, Advanced logic & Power RF
Quality & Reliability

REL-6043-290.07W

Reliability Evaluation Plan and final results on MLPD3x3 - Muar plant

Test Vehicle: ST1S06

Line.. UM87 **Package. MLPD3x3-6L**

Test	Conditions	S.S.	Requirement	Results
PRECONDITIONING OF SMD DEVICES BEFORE TC/THB/PPT	DRYNG 1H @ 125°C STORE 168H @ TA=85°C RH=85% IR REFLOW 3 CYCLES @ 260°C+0 -0 °C	231x3 Lot	Parameter within spec. limits at end of precon-ditionings after go no go test.	No parameter deviation at end of preconditionings.
H.T.S.	TA=150 °C	77 x 3 Lot	Parameter deviation within spec. limits	No parameter deviation at 1000 hours.
T.H.B.	*D.U.T. SMD PRECONDITIONED LEVEL* 1 JEDEC TA=85°C - RH=85% Vbias= 7V, 2.5V	77 x 3 Lot	Parameter deviation within spec. limits	No parameter deviation at 1000 hours.
PRESSURE POT	*D.U.T. SMD PRECONDITIONED LEVEL 1 JEDEC* TA=121°C - PA=2Atm	77 x 3 Lot	Parameter deviation within spec. limits	No parameter deviation at 168 hours.
THERMAL CYCLES AIR TO AIR	*D.U.T. SMD PRECONDITIONED LEVEL 1 JEDEC* TA=-65°C TO 150°C 1 HOUR / CYCLE	77 x 3 Lot	Parameter deviation within spec. limits	No parameter deviation at 500 cy
SMD MOISTURE INDUCED STRESS	DRYNG 1H @ 125°C STORE 168H @ TA=85°C RH=85% IR REFLOW 3 CYCLES @ 260°C+0 -0 °C	25 x 3 Lot	Parameter deviation within spec. limits at end of test.	No parameter deviation at end of test.

Present evaluation is valid for all ST1S06 versions

Comments: The reliability tests results are aligned to our STD production.

Products impacted from MCD

Commercial Product	Finished Good
ST7L2C56U/NXBTR	7L2C56U/NXBTR$M3
ST7L2C56U/NXBTR	7L2C56U/NXBTR$U3

Qualification Certificate

REPORT NUMBER: **MMS-MCD_QA07-013**

QUALIFICATION TYPE: **PACKAGE QUALIFICATION**

QUALIFICATION IDENTIFICATION

The purpose is to confirm the good reliability of the package processed in the following conditions:

- VFQFPN 7x7x1.0- 48 pins- PITCH 0.5
- ST Muar

CONCLUSION

This qualification was performed in accordance with the General Product Qualification Procedure (STMicroelectronics specification SOP2610).

The VFQFPN48 package passed qualification testing and the production is now authorized in ST Muar assembly plant.

CERTIFIED by:

Gisèle SEUBE
Microcontroller Division QA Dept.

Date: Oct 25th, 2007

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