



# PowerQUICC Communications Processor

MPC8544 Product Family Rev. 2.1  
783 Lead and Leadfree FC-PBGA Package  
Global Foundries 90nm SOI CMOS

## Industrial Qualification Report

Industrial part is at 1.0 V at 105°C use

MPC8544VTALFA  
MPC8544VTANGA  
MPC8544VTAQGA  
MPC8544VTARJA  
MPC8544CVTALFA  
MPC8544CVTANGA  
MPC8544CVTAQGA  
MPC8544EVTALFA  
MPC8544EVTANGA  
MPC8544EVTAQGA  
MPC8544EVTARJA  
MPC8544ECVTALFA  
MPC8544ECVTANGA  
MPC8544ECVTAQGA  
SC8544ECPXALFA  
SC8544CPXANGA  
SC8544CPXAQGA  
SC8544PXANGA  
SC8544PXARJA

Dev No./ Rev.: MPC8544 / Rev. 2.1 Kathy Badger Torres		Report Rev.:A.3
Description: PowerQUICC38K		
Technology: Global Foundries CMOS 90 SOI	Package:783leadfree FC-PBGA	Date: 2/8/2011 Page 1 of 7



## Product Information

Package	783 FC-PBGA, 29 x 29 mm (w/ o lid)
Device	MPC8544
Mask Set	2M35S
Die Size	( 62.88 mm <sup>2</sup> w/ o scribe)
Die Coating(s)	Polyimide
Product Specs	1.0V+/-5%, 105C max, 14w
Memory	2x32KB L1 cache, 256KB L2 cache (all with ECC)
Name/ Location of Die Fab Facility	Global Foundries / Singapore
Process Technology	CMOS90SOI, bit cell size 1.115, SiCOH/ SiCOH Mx
Poly / Metal layers	1P / 7M
Gox Thickness	15Å
C4 Bump Site	Amkor T5
C4 Sphere Size and Composition	Ni-UBM (Ni <sub>2</sub> ), 95um Diameter, 185um pitch, 95/5 Pb/ Sn
Test Location	KLM
Assembly Location	KLM
Moisture Sensitivity Level	MSL3 / 260°C Reflow
Substrate Supplier	Supplier M

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**MPC8544 Rev 2.1 Industrial Product Reliability Data Summary**

**High Temperature Operating Life Test (HTOL) Tj=130°C, V=1.4V**

Wafer Lot	Trace Code	Rev	31 hours Fail/Sample Size	79 hours Fail/Sample Size	5 years 177 hours Fail/Sample Size	10 years 351 hours Fail/Sample Size
QA18200	ZLMHA19CTG00	2.1	0/120	0/120	0/120	0/120
QA1830	ZLMHA19FFV00	2.1	0/80	0/80	0/80	0/80
QA1840	ZLMHA19FFW00	2.1	0/120	0/120	0/120	0/120
<b>Totals</b>			<b>0/320</b>	<b>0/320</b>	<b>0/320</b>	<b>0/320</b>

**Electrostatic Discharge (ESD)**

Wafer Lot	Rev	Substrate Supplier	2KV HBM Fail/Sample Size	250V CDM All Pins Fail/Sample Size	500V CDM Excluding Lynx Pins Fail/Sample Size
QA9035	2.0	M	0/3	0/3	0/3
QA8028	2.0	M	0/3	0/3	0/3
QA8033	2.0	M	0/3	0/3	0/3
QA9034	2.0	N	0/3	0/3	0/3
QA18200	2.1	M	N/A	0/3	0/3
<b>Totals</b>			<b>0/12</b>	<b>0/15</b>	<b>0/15</b>

**Moisture Sensitivity Level Characterization**

Wafer Lot	Substrate Supplier	Rev	MSL3 / 260°C
QA0184	M	2.1	0/80
QA9034	M	2.0	0/22
QA8028	N	2.0	0/22
<b>Totals</b>			<b>0 / 124</b>

**Temperature Cycle / -55°C to 125°C Air to Air with Preconditioning @ MSL3 / 260°C IR Reflow**

Wafer Lot	Assembly Lot	Substrate Supplier	Rev	500 Cycles	1000 Cycles
QA9034	WEMHA0ZRF300	M	2.0	0/80	0/80
QA8028	WEMHA0Y1W00	N	2.0	0/79 <sup>A</sup>	0/79
QA8174	WEMHA0YA8C00	M	2.0	0/80	0/80
QA8174	WEMHA0YA8Z00	M	2.0	0/79 <sup>A</sup>	0/79
QA8174	WEMHA0YA8A00	M	2.0	1/80 <sup>B</sup>	0/79
<b>Total</b>				<b>1/398</b>	<b>0/397</b>

<sup>A</sup> Failed electrical test. FA indicated a C4 solder bump defect. Improved clean fixed the issue.

<sup>B</sup> Failed electrical test. Unit removed from analysis, as number of units successfully run through temp cycle exceeds Freescale requirement of 0/231 units from 3 lots.



**Temperature Humidity Bias / 85°C, 85%R.H., 1.0v with Preconditioning @ MSL3 / 260°C IR Reflow**

Wafer Lot	Assembly Lot	Substrate Supplier	Rev	504 Hours	1008 Hours
QA9034	WEMHA0ZRF300	M	2.0	0/15	0/15
QA8028	WEMHA0Y1W00	N	2.0	0/15	0/15
QA8174	WEMHA0YA8C00	M	2.0	0/15	0/15
QA8174	WEMHA0YA8Z00	M	2.0	0/15	0/15
QA8174	WEMHA0YA8A00	M	2.0	0/15	0/15
<b>Total</b>				<b>0/75</b>	<b>0/75</b>

**High Temperature Bake / 150°C**

Wafer Lot	Assembly Lot	Substrate Supplier	Rev	504 Hours	1008 Hours
QA9034	WEMHA0ZRF300	M	2.0	0/80	0/80
QA8028	WEMHA0Y1W00	N	2.0	0/80	0/80
QA8174	WEMHA0YA8C00	M	2.0	0/40	0/40
QA8174	WEMHA0YA8Z00	M	2.0	0/80	0/80
QA8174	WEMHA0YA8A00	M	2.0	0/80	0/80
<b>Total</b>				<b>0/360</b>	<b>0/360</b>

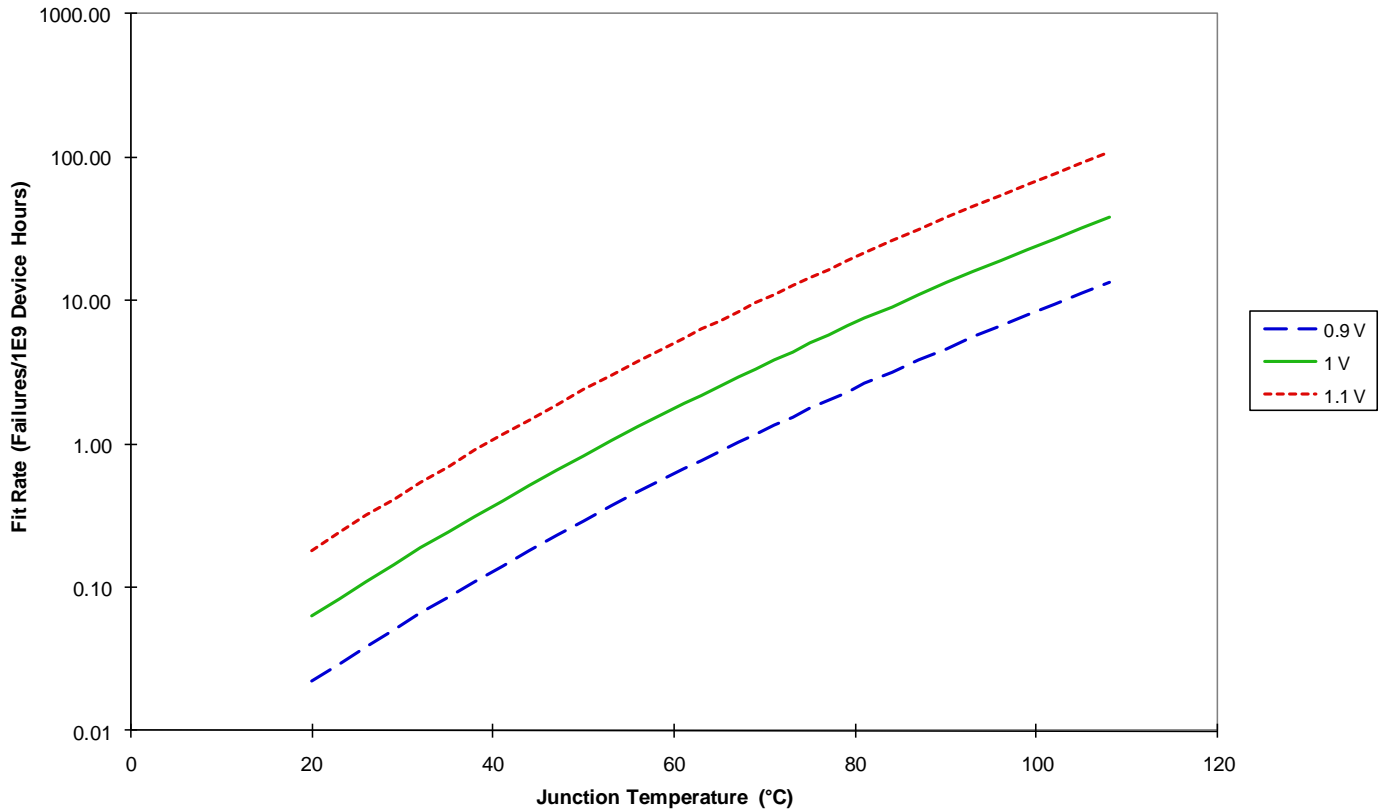
**uHAST / 130°C/85%RH/33PSI, with Preconditioning @ MSL3 / 260°C IR Reflow**

Wafer Lot	Assembly Lot	Substrate Supplier	Rev	96 Hours
QA9034	WEMHA0ZRF300	M	2.0	0/80
QA8028	WEMHA0Y1W00	N	2.0	0/80
QA8174	WEMHA0YA8C00	M	2.0	0/80
QA8174	WEMHA0YA8Z00	M	2.0	1/80 <sup>C</sup>
QA8174	WEMHA0YA8A00	M	2.0	0/80
<b>Total</b>				<b>1/400</b>

<sup>C</sup> Failed electrical test. FA indicated a C4 solder bump defect. Improved clean fixed the issue.

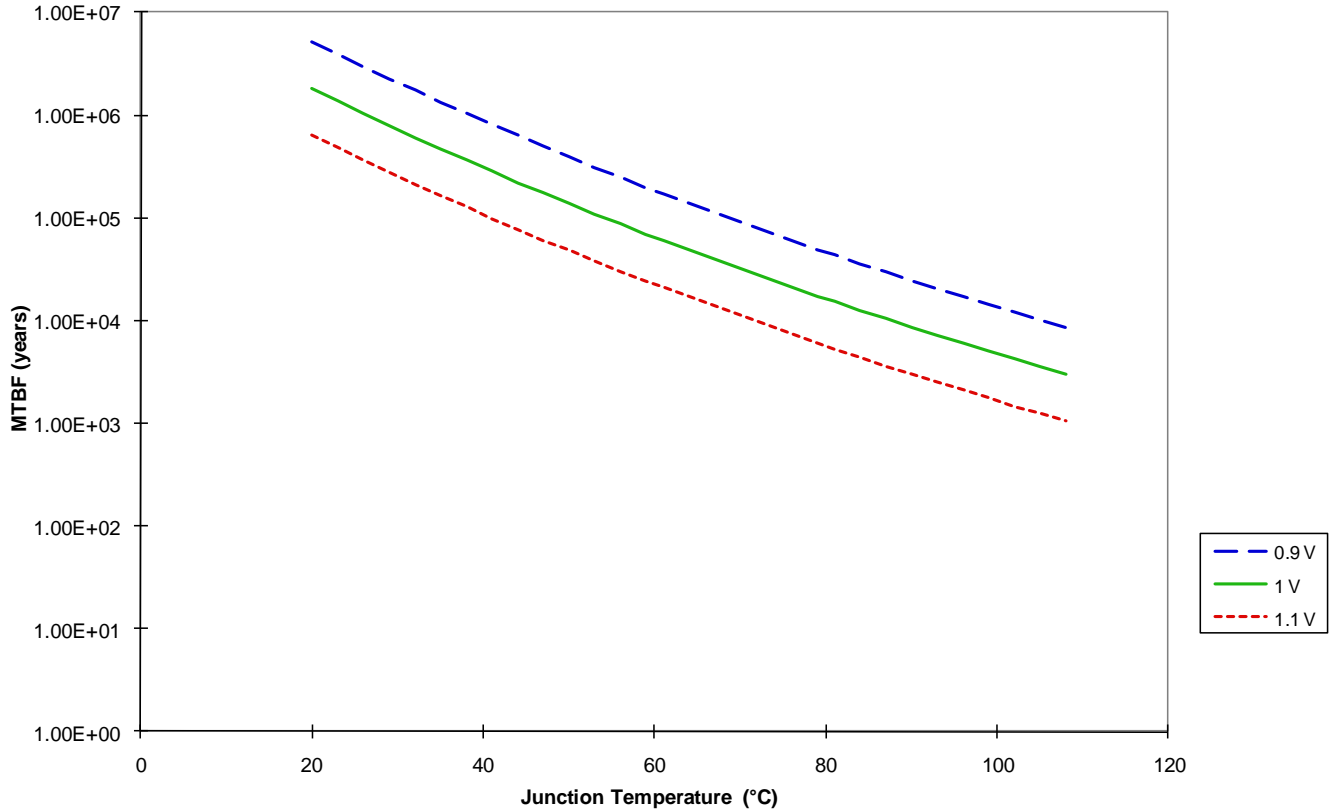
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**FITs vs Junction Temperature: MPC8544**  
**Thermal and Voltage Acceleration**  
**eA = 0.7 eV, Beta = 10.5, 60% Confidence**



Tj	0.9 V	1 V	1.1 V
95 °C	6	17	51
105 °C	11	32	92
115 °C	19	56	160

**MTBF vs Junction Temperature: MPC8544**  
**Thermal and Voltage Acceleration**  
**eA = 0.7 eV, Beta = 10.5, 60% Confidence**



Tj	0.9 V	1 V	1.1 V
95 °C	1.8E+4	6.3E+3	2.2E+3
105 °C	1.0E+4	3.5E+3	1.2E+3
115 °C	5.8E+3	2.0E+3	7.1E+2



## Revision History

Revision History			
Revision	Date	Comment	Author
A.3	2/8/2011	Original	Kathy Badger Torres

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