



PowerQUICC2 Pro Communications Processor

MPC836x Product Family Rev. 1.2, 2.0 and 2.1

Qualification Report

MPC8360/8358 - 740 Lead, 37.5 x 37.5 mm, 1mm pitch TBGA (ZU, VV)

MPC8360
MPC8358

MPC8358 - 668 Lead, 29 x 29 mm, 1mm pitch TEPBGA2 (ZQ, VR)

MPC8358

Product Information

Product / Technology / Fab / Package Description	
Package	740 Lead TBGA (ZU, VV) 37.5 x 37.5 mm, 1mm pitch 668 Lead TEPBGA2 (ZQ, VR) 29 x 29 mm, 1mm pitch
Device	MPC8360/8358 PowerQUICC2 Pro Rev 2 and 2.1
Mask Set	M13E
Die Coating(s)	Polyimide
Die Fab Facility	Freescale Austin Technology & Manufacturing Center (ATMC)
Fab Process Technology	0.13um HiP7B
Poly / Metal layers	1P / 6M
Package Assembly Facility	Freescale Kuala Lumpur Final Manufacturing (KLM)
Moisture Sensitivity Level	MSL3 / 260°C Reflow
C5 Sphere Composition	Standard: 62% Pb, 36% Sn, 2% Ag (740 Lead TBGA (ZU) and 668 Lead TEPBGA2 (ZQ)) Pb Free: 95.5% Sn, 4.0% Ag, 0.5% Cu (740 Lead TBGA (VV)) Pb Free: 96.5% Sn, 3.5% Ag (668 Lead TEPBGA 2(VR)) Rev 2.1 packages use 96.5% Sn, 3.5% Ag spheres for Lead-free parts.
Substrate Supplier	740 Lead TBGA - Supplier A 668 Lead TEPBGA2 – Supplier A

MPC8360/8358 PowerQUICC2 Pro Rev 2 Product Reliability Data Summary

Electrical Characterization

MPC8360 Rev 2.0 and 2.1

Lot / Mask Set / Rev / Pkg	Room, Hot and Cold Temperatures
D24395, D24102, D24715 / W00M13E / Rev 2.0 / TBGA	0 / 15
DD331501 / W01M13E / Rev 2.1 / TBGA	0 / 5
D24395, D27930, D24715 / W30M13E / Rev 2.0 / TEPBGA2	0 / 15
DD331509 / W31M13E / Rev 2.1 / TEPBGA2	0 / 5
Totals	0 / 40

Electrostatic Discharge (ESD) and Latch-up Test

MPC8360 Rev 2.0 and 2.1

Lot / Mask Set / Rev / Pkg	HBM / 2KV	MM / 200V	CDM / 500V – No Socket	Latch-up / 200mA
D24102 / W00M13E / Rev 2 / TBGA	1 / 3*	0 / 3	0 / 3	0 / 3
D24395 / W00M13E / Rev 2 / TBGA	3 / 6*	0 / 3	0 / 3	0 / 3
D24715 / W00M13E / Rev 2 / TBGA	0 / 3	0 / 3	0 / 3	0 / 3
DD331501 / M13E / Rev 2.1/TBGA	0 / 5	0 / 5	0 / 5	0 / 6
D24395 / M13E / Rev 2.0/TEPBGA2	0 / 3	0 / 3	0 / 3	0 / 3
D27930 / M13E / Rev 2.0/TEPBGA2	0 / 3	0 / 3	0 / 3	0 / 3
D24715 / M13E / Rev 2.0/TEPBGA2	0 / 3	0 / 3	0 / 3	0 / 3
DD331509 / M13E / Rev 2.1/TEPBGA2	0 / 5	0 / 5	0 / 5	0 / 6
Totals	4 / 31	0 / 28	0 / 28	0 / 30

*HBM ESD Note:

Freescale Qualification requirement for Human Body Model ESD is 2000V for all pins.

All pins, except CE_PD12 (B5) to GND fail for leakage at 2000V, passed at 1800V on Rev 2.

Errata written – Pin B5 does not meet the 2000V HBM ESD criteria on Rev 2. Rev 2.1 meets the ESD HBM requirement of 2KV.

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Device: MPC8360/8358 Rev. 1.2 ,2.0, 2.1		Revision date: 2/21/2012
Technology: ATMC HiP7B	Package: 740 TBGA & 668 TEPBGA2	Page 2 of 8

High Temperature Operating Life Test (HTOL) – Vd1/Vd2 1.8v/3.3v, Tj 130C (Avg)

MPC8360 Rev 2.0 and 2.1

Lot / Mask Set / Rev	295 hrs readpoint for 10 yr. Op life, Vdd 1.2V	640 hrs readpoint for 10 yr. Op life, Vdd=1.3V	1008 hrs readpoint
D24395 / M13E / Rev 2.0/TBGA	0 / 79*	0 / 79	0 / 79
D24102 / M13E / Rev 2.0/TBGA	0 / 80	0 / 79*	0 / 79
D24715 / M13E / Rev 2.0/TBGA	0 / 80	0 / 80	0 / 80
DD331501 / M13E / Rev 2.1/TBGA	0 / 80	0 / 80	0 / 80
D24395 / M13E / Rev 2.0/TEPBGA2	0 / 80	0 / 80	0 / 80
D27930 / M13E / Rev 2.0/TEPBGA2	0 / 80	0 / 80	0 / 80
D24715 / M13E / Rev 2.0/TEPBGA2	0 / 80	0 / 80	0 / 80
DD331509 / M13E / Rev 2.1/TEPBGA2	0 / 80	0 / 80	0 / 80
Totals	0 / 639	0 / 638	0 / 638

* One unit of D24395 and one unit of D24102 failed due to software which controlled oven temperature. Corrective action taken by IT.

High Temperature Operating Life Test (HTOL) Drift Analysis – Voltage 1.8v/3.3v, Tj 130°C (Avg)

MPC8360 Rev 2.0 and 2.1

Lot / Mask Set / Rev	295 hrs readpoint	640 hrs readpoint	1008 hrs readpoint
D24395 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
D24102 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
D24715 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
DD331501 / M13E / Rev 2.1/TBGA	0 / 5	0 / 5	0 / 5
D24395 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
D27930 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
D24715 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
DD331509 / M13E / Rev 2.1/TEPBGA2	0 / 5	0 / 5	0 / 5
Totals	0 / 40	0 / 40	0 / 40

High Temperature Operating Life Test (HTOL) Fmax Analysis – Voltage 1.8v/3.3v, Tj 130°C (Avg)

MPC8360 Rev 2.0 and 2.1

Lot / Mask Set / Rev	295 hrs readpoint	640 hrs readpoint	1008 hrs readpoint
D24395 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
D24102 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
D24715 / M13E / Rev 2.0/TBGA	0 / 5	0 / 5	0 / 5
DD331501 / M13E / Rev 2.1/TBGA	0 / 5	0 / 5	0 / 5
D24395 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
D27930 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
D24715 / M13E / Rev 2.0/TEPBGA2	0 / 5	0 / 5	0 / 5
DD331509 / M13E / Rev 2.1/TEPBGA2	0 / 5	0 / 5	0 / 5
Totals	0 / 40	0 / 40	0 / 40

MPC8360/8358 PowerQUICC2 Pro Rev 2 Product Reliability Data Summary (cont.)**Moisture Sensitivity Level Characterization**

MPC8360, Rev 2 – 740 Lead 37.5mm TBGA Package

Assy Site / Substrate Supplier / Lots	MSL3 / 260°C
KLM / Substrate Supplier A / Assy lots 1-3	0 / 66
Totals	0 / 66

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

MPC8360, Rev 2 – 740 Lead 37.5mm TBGA Package

Assy Site / Substrate Supplier / Lots	400 Cycles	800 Cycles	1000 Cycles
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240	0 / 240
Totals	0 / 240	0 / 240	0 / 240

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Temperature Humidity Bias / 85°C, 85%R.H., 0.9v/3.3v with Preconditioning @ MSL3 / 260°C IR Reflow

MPC8360, Rev 1.2 – 740 Lead 37.5mm TBGA Package

Assy Site / Substrate Supplier / Lots	504 Hours	1008 Hours
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240
Totals	0 / 240	0 / 240

High Temperature Bake / 150°C

MPC8360, Rev 2 – 740 Lead 37.5mm TBGA Package

Assy Site / Substrate Supplier / Lots	504 Hours	1008 Hours
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240
Totals	0 / 240	0 / 240

Autoclave / 121°C, 100% RH, 15 PSIG with Preconditioning @ MSL3 / 260°C IR Reflow

MPC8360, Rev 1.2 – 740 Lead 37.5mm TBGA Package

Assy Site / Substrate Supplier / Lots	96 hour
KLM / Substrate Supplier A / Assy lot 1	0 / 45
Totals	0 / 45

MPC8360/8358 PowerQUICC2 Pro Rev 2 Product Reliability Data Summary (cont.)**Moisture Sensitivity Level Characterization**

MPC8358, Rev 2 – 668 Lead 29mm TEPBGA2 Package

Assy Site / Substrate Supplier / Lots	MSL3 / 260°C
KLM / Substrate Supplier A / Assy lots 1-3	0 / 66
Totals	0 / 66

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

MPC8358, Rev 2 – 668 Lead 29mm TEPBGA2 Package

Assy Site / Substrate Supplier / Lots	400 Cycles	800 Cycles	1000 Cycles
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240	0 / 240
Totals	0 / 240	0 / 240	0 / 240

Temperature Humidity Bias / 85°C, 85%R.H., 0.9v/3.3v with Preconditioning @ MSL3 / 260°C IR Reflow

MPC8358, Rev 2 – 668 Lead 29mm TEPBGA2 Package

Assy Site / Substrate Supplier / Lots	504 Hours	1008 Hours
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240
Totals	0 / 240	0 / 240

High Temperature Bake / 150°C

MPC8358, Rev 2 – 668 Lead 29mm TEPBGA2 Package

Assy Site / Substrate Supplier / Lots	504 Hours	1008 Hours
KLM / Substrate Supplier A / Assy lots 1-3	0 / 240	0 / 240
Totals	0 / 240	0 / 240

Autoclave / 121°C, 100% RH, 15 PSIG with Preconditioning @ MSL3 / 260°C IR Reflow

MPC8358, Rev 2 – 668 Lead 29mm TEPBGA2 Package

Assy Site / Substrate Supplier / Lots	96 hour
KLM / Substrate Supplier A / Assy lot 1	0 / 45
Totals	0 / 45

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740TBGA Center Gate Molding Qualification

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

MPC8360, Rev 2.1 740 TBGA Package

Qual Lot	400 Cycles	700 Cycles	1000 Cycles
Qual Lot A	0 / 80	0 / 80	0 / 80
Qual Lot B	0 / 80	0 / 80	0 / 80
Qual Lot C	0 / 80	0 / 80	0 / 80
Totals	0 / 240	0 / 240	0 / 240

Moisture Sensitivity Level Characterization

MPC8360, Rev 2.1 740 TBGA Package

Qual Lot	MSL3 / 260°C
Qual Lot A	0 / 22
Qual Lot B	0 / 22
Qual Lot C	0 / 22
Totals	0 / 66

uHAST / 130°C, 85% RH, 33.1 PSIG with Preconditioning @ MSL3 / 260°C IR Reflow

MPC8360, Rev 2.1 – 740 TBGA Package

Qual Lot	96 hours
Qual Lot A	0 / 80
Qual Lot B	0 / 80
Qual Lot C	0 / 80
Totals	0 / 240

High Temperature Storage Life, 150°C

MPC8360, Rev 2.1 – 740 TBGA Package

Qual Lot	504 hrs	1008 hrs
Qual Lot A	0 / 80	0 / 80
Qual Lot B	0 / 80	0 / 80
Qual Lot C	0 / 80	0 / 80
Totals	0 / 240	0 / 240

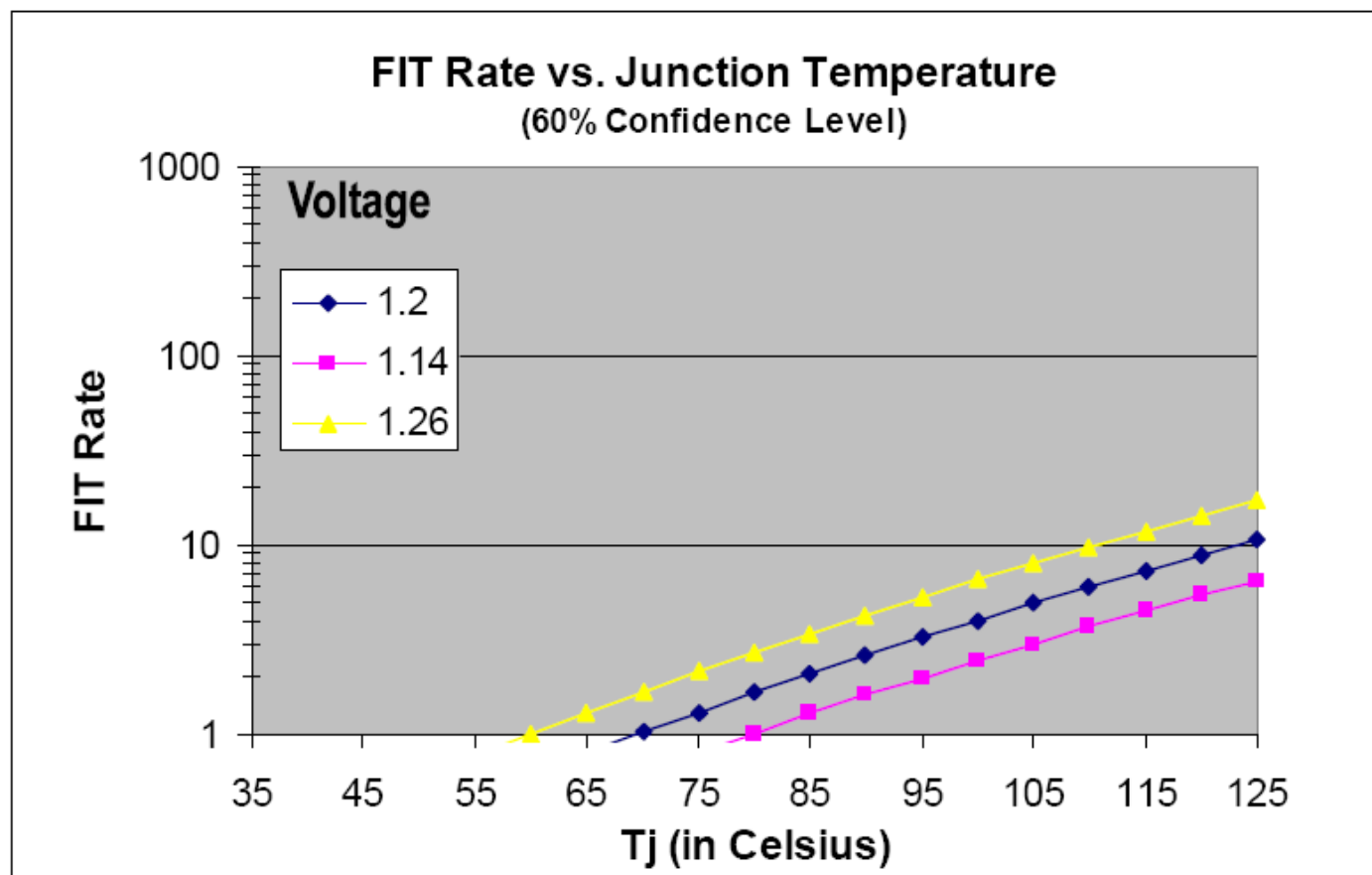
Temperature Humidity Biasing with Preconditioning @ MSL3 / 260°C IR Reflow*

MPC8360, Rev 2.0 740 TBGA Package

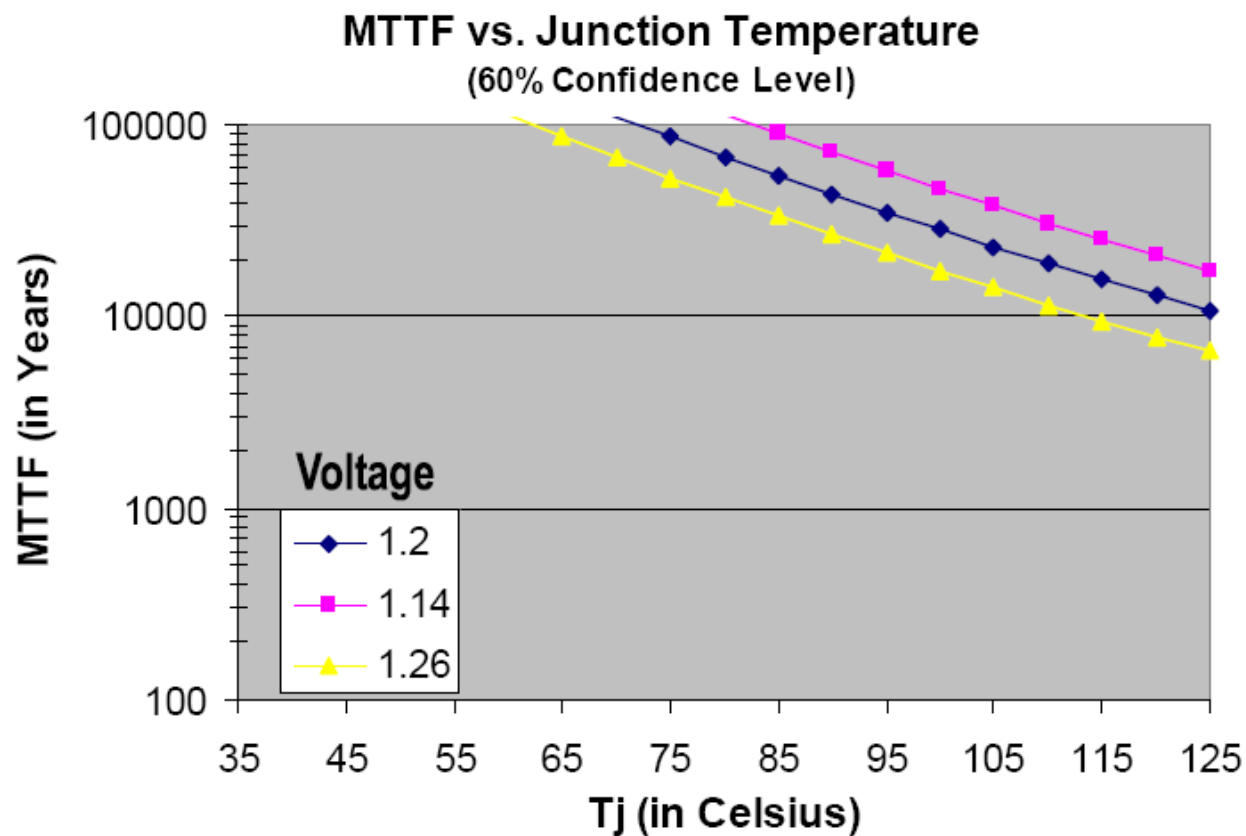
Qual Lot	504 hrs	1008 hrs
Qual Lot A	0 / 15	0 / 15
Qual Lot B	0 / 15	0 / 15
Qual Lot C	0 / 15	0 / 15
Totals	0 / 45	0 / 45

*THB QBS data from MPC8360 Rev 2.0 with Center Gate Molding

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Revision History

Revision History			
Revision	Date	Comment	Author
Original	12/21/06	MPC8360 PowerQUICC2 Pro Rev 2 Qualification Report.	Dipak Gandhi
Rev A	1/2/07	Added Rev 1.2 and updated ESD HBM comments	Dipak Gandhi
Rev B	8/2/07	Added TEPBGA2 qualification data	Dipak Gandhi
Rev C	8/28/07	Added TBGA rev 2.1 qualification data	Dipak Gandhi
Rev D	1/7/08	Updated rev 2 ESD HBM comment	Dipak Gandhi
Rev E	6/16/08	Clarified C5 spheres comment for rev 2.1 lead-free packages	Dipak Gandhi
Rev F	2/21/2012	Added Center Gate Molding Qualification data for 740 TBGA	Navin Kumar

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