



MC Qualification of Kahlua II Rev. D
MPC8241/8245
MOS-13 HiP4DP
Rev. 1.4
Qualification Report

MPC8241/8245 Product Information:

Product / Technology / Fab / Package Description		
Package	MPC8241: 357 PBGA (ZP), 25 x 25 mm	MPC8245: 352 TBGA (ZU), 35 x 35 mm
Device	MPC8241	MPC8245
Mask Set	4K78P	4K78P

Device No./Rev.: MPC8241/8245, Rev. 1.4	Report Rev.: C
Description: MC Qualification of MPC8241/8245 ("Kahlua II") Rev. D	Revision date: 3/4/05
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Die Area	49.2 mm ²	49.2 mm ²
Die Coating	Hitachi S200 Polyimide	Hitachi S200 Polyimide
Name/Location of Die Fab Facility	MOS-13 / Austin TX	MOS-13 / Austin TX
Process Technology	0.25µm HiP4DP	0.25µm HiP4DP
Poly / Metal layers	1P / 5M	1P / 5M
Assembly Location	Motorola, KLM	Motorola, KLM
Mold Compound	Shin-Etsu KMC-211-2F	Dexter FP4451 dam, Nagase T693/R1001 glob filler
Die Attach Material	Ablebond 8360	CRM-1525
Wire Material / Diameter	Au / 0.98 mil	Au / 0.98 mil
Solder Ball Material / Diameter	62% Pb, 36% Sn, 2% Ag / 0.75 mm	62% Pb, 36% Sn, 2% Ag / 0.75 mm
Pb Free Solder Sphere Material	95.5%Sn, 4.0%Ag, 0.5%Cu	95.5%Sn, 4.0%Ag, 0.5%Cu
Moisture Sensitivity Level / Reflow Temp	MSL3 / 220°C	MSL3 / 220°C
Substrate Supplier	Ibiden	Compass / Hitachi

MPC8241/8245 Product Reliability Data Summary:

HTOL / 2.35V, 125°C					
Lot / Mask Set	168 Hours	196 Hours	504 Hours	1008 Hours	
0K78P	0 / 93	0 / 93	0 / 93	0 / 93	
1K78P	0 / 90				
2K78P	0 / 96				

HTOL / 2.6V, 125°C					
Lot / Mask Set	144 Hours ⁽¹⁾	168 Hours	196 Hours		
D5296696 / 4K78P	0 / 80	0 / 80	0 / 80		
D576721000 / 4K78P	0 / 77				
D586441000 / 4K78P	0 / 77				

Note: ⁽¹⁾ Industrial-tier readpoint based on 10 years operation at 1.8V and 105°C Tj.

ESD / Latch-up					
Lot	HBM / 2KV	MM / 200V	CDM / 500V – No Skt	Latch-up / 200mA	
0K78P	0 / 3	0 / 3		0 / 3	
1K78P	0 / 6	0 / 6	0 / 6	0 / 9	
D5296696 / 4K78P	0 / 3	0 / 3	0 / 3	0 / 3	

MPC8241/8245 HiP4DP Process Certification Data (Test Vehicle: XPC745,755A/B Product):

HTOL / Vd1-2.5V, Ta - 90°C, Tj - 110-120°C					
Lot / Mask Set	24 Hours	48 Hours			
XPC755A – HiP4DP	1 / 2199 (0.045%)	0 / 2168 (0.045%)			
Totals	1 / 2199 (0.045%)	0 / 2168 (0.045%)			
Failure Comments	24h–Unknown fail				

HTOL / Vd1-2.35V, Ta - 90°C, Tj - 110-120°C					
Lot / Mask Set	24 Hours	168 Hours	504 Hours	1008 Hours	
XPC755A/B – HiP4DP	0 / 136	0 / 325	0 / 229	0 / 229	
Totals	0 / 136	0 / 325	0 / 229	0 / 229	

MPC8241 Pb Free Package Reliability Data (Test Vehicle: 357-pin PBGA with MPC860P Product, 95.5%Sn, 4.0%Ag, 0.5%Cu):

Moisture Sensitivity Level Characterization

Assembly Site /Substrate Supplier	MSL3 / 245°C	MSL3 / 260°C
KLM / Substrate Supplier A / 3 assy lots	0 / 72	0 / 72
KLM / Substrate Supplier B / 3 assy lots	0 / 66	0 / 66
Totals	0 / 138	0 / 138

Autoclave / 121°C, 100% RH, 15 PSIG with Preconditioning @ MSL3 / 245°C IR Reflow

Lot / Mask Set	48 Hours	96 Hours	144 Hours
KLM / Substr. Supplier A / 3 assy lots	0 / 246	0 / 246	0 / 246
Totals	0 / 246	0 / 246	0 / 246

Temperature Cycle / -65°C to 150°C Air to Air with Preconditioning @ MSL3 / 245°C IR Reflow

Lot / Mask Set	200 Cycles	500 Cycles	
KLM / Substr. Supplier A / 3 assy lots	0 / 246	0 / 246	
KLM / Substr. Supplier B / 3 assy lots	0 / 240	0 / 240	
Totals	0 / 486	0 / 486	

Temperature Cycle / -65°C to 150°C Air to Air with Preconditioning @ MSL3 / 260°C IR Reflow

Lot / Mask Set	200 Cycles	500 Cycles	
KLM / Substr. Supplier A / 3 assy lots	0 / 246	0 / 246	
KLM / Substr. Supplier B / 3 assy lots	0 / 240	0 / 240	
Totals	0 / 486	0 / 486	

Temperature Humidity Bias / 85°C, 85%R.H., Nominal Bias with Preconditioning @ MSL3 / 245°C IR Reflow

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Assembly Site /Substrate Supplier	504 Hours	1008 Hours
KLM / Substr. Supplier A / 3 assy lots	0 / 219	0 / 217
Totals	0 / 219	0 / 219

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

Assembly Site /Substrate Supplier	504 Hours	1008 Hours
KLM / Substr. Supplier A / 3 assy lots	0 / 240	0 / 240
KLM / Substr. Supplier B / 3 assy lots	0 / 240	
Totals	0 / 480	0 / 240

High Temperature Bake (HTB) 150°C

Assembly Site /Substrate Supplier	504 Hours	1008 Hours
KLM / Substr. Supplier A / 3 assy lots	0 / 240	0 / 240
KLM / Substr. Supplier B / 3 assy lots	0 / 240	0 / 240
Totals	0 / 480	0 / 480

MPC8245VV 352 Lead 35 x 35 TBGA Pb Free Product Reliability Data Summary:

Test Vehicle MPC8260VV 37.5 x 37.5 480 Lead TBGA Pb Free (95.5%Sn, 4.0%Ag, 0.5%Cu)

Moisture Sensitivity Level Characterization

Product - Package Assy Site / Substrate Supplier / Lots	MSL3 / 245°C
MPC8260 – 480 TBGA KLM / Substrate Supplier A / 3 assy lots	0 / 66
MPC8260 – 480 TBGA KLM / Substrate Supplier B / 3 assy lots	0 / 65
Totals	0 / 131

Temperature Cycle / -65°C to 150°C Air to Air with MSL3 / 245°C IR Reflow Preconditioning

Product - Package Assy Site / Substrate Supplier / Lots	200 Cycles	500 Cycles
MPC8260 – 480 TBGA KLM / Substrate Supplier A / 3 assy lots	0 / 239	0 / 239
MPC8260 – 480 TBGA KLM / Substrate Supplier B / 3 assy lots	0 / 240	0 / 240
Totals	0 / 479	0 / 479

Temperature Humidity / 85°C, 85%R.H. with MSL3 / 245°C IR Reflow Preconditioning

Product - Package Assy Site / Substrate Supplier / Lots	168 Hours	504 Hours	1008 Hours
MPC8260 – 480 TBGA KLM / Substrate Supplier A / 3 assy lots	0 / 240	0 / 240	0 / 240
MPC8260 – 480 TBGA KLM / Substrate Supplier B / 3 assy lots	0 / 239	0 / 239	0 / 239
Totals	0 / 479	0 / 479	0 / 479

MPC8245ZU Pb Bearing Package Reliability Data (Test Vehicle: 480-pin TBGA with XPC8260 Product):

Moisture Sensitivity Level Characterization				
Lot / Mask Set	MSL4	MSL3		
KLM / Substrate Supplier A - 3 lots / HiP3 Product	0 / 45	0 / 45		
KLM / Substrate Supplier B - 3 lots / HiP3 Product	0 / 45	0 / 45		
ASAT - 3 lots / HiP3 Product	0 / 45	0 / 45 (2 lots)		
Totals	0 / 135	0 / 135		
Failure Comments				

Autoclave / 121°C, 100% RH, 15 PSIG with Preconditioning @ MSL4 / 220°C VPR*				
Lot / Mask Set	48 Hours	144 Hours		
KLM / Substrate Supplier A - 3 lots / HiP3 Product	0 / 231	0 / 231		
KLM / Substrate Supplier B - 3 lots / HiP3 Product	0 / 231	0 / 231		
ASAT - 3 lots / HiP3 Product	0 / 230	0 / 230		
Totals	0 / 692	0 / 692		
Failure Comments				

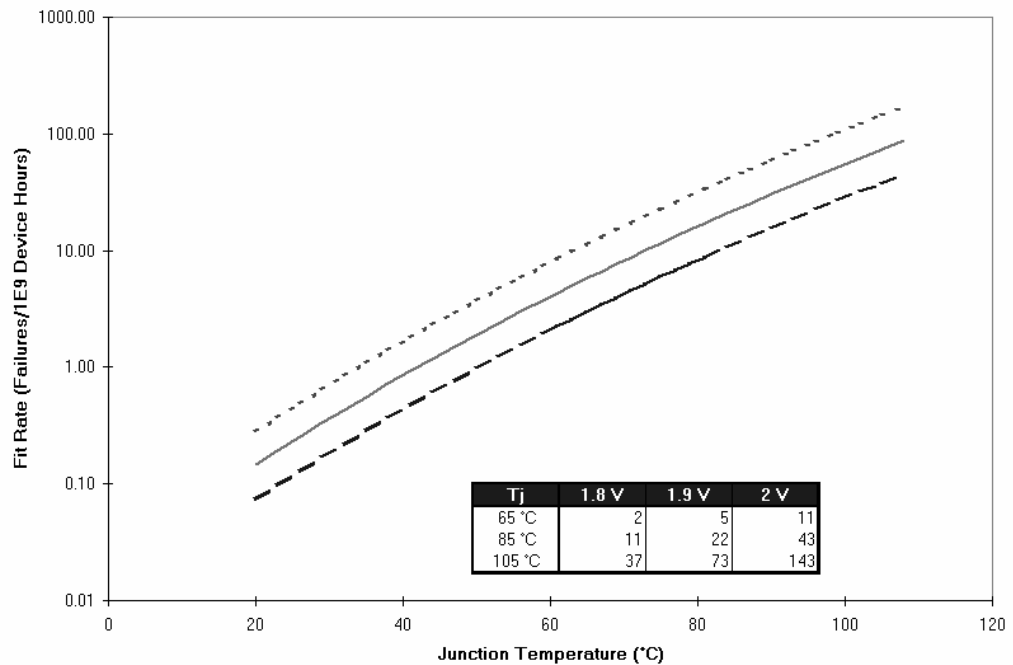
Temperature Cycle / -65°C ↔ 150°C Air to Air with Preconditioning @ MSL4 / 220°C VPR*				
Lot / Mask Set	100 Cycles	500 Cycles		
KLM / Substrate Supplier A - 3 lots / HiP3 Product	0 / 231	0 / 231		
KLM / Substrate Supplier B - 3 lots / HiP3 Product	0 / 231	0 / 231		
ASAT - 3 lots / HiP3 Product	0 / 230	0 / 230		
Totals	0 / 693	0 / 693		
Failure Comments				

Temperature Humidity Bias / 85°C, 85%R.H., Nominal Bias with Preconditioning @ MSL4 / 220°C VPR*				
Lot / Mask Set	504 Hours	1008 Hours		
KLM / Substrate Supplier A - 3 lots / HiP3 Product	0 / 231			
ASAT - 3 lots / HiP3 Product, * w/ MSL5 PC	0 / 231	0 / 231		
Totals	0 / 462	0 / 231		
Failure Comments				

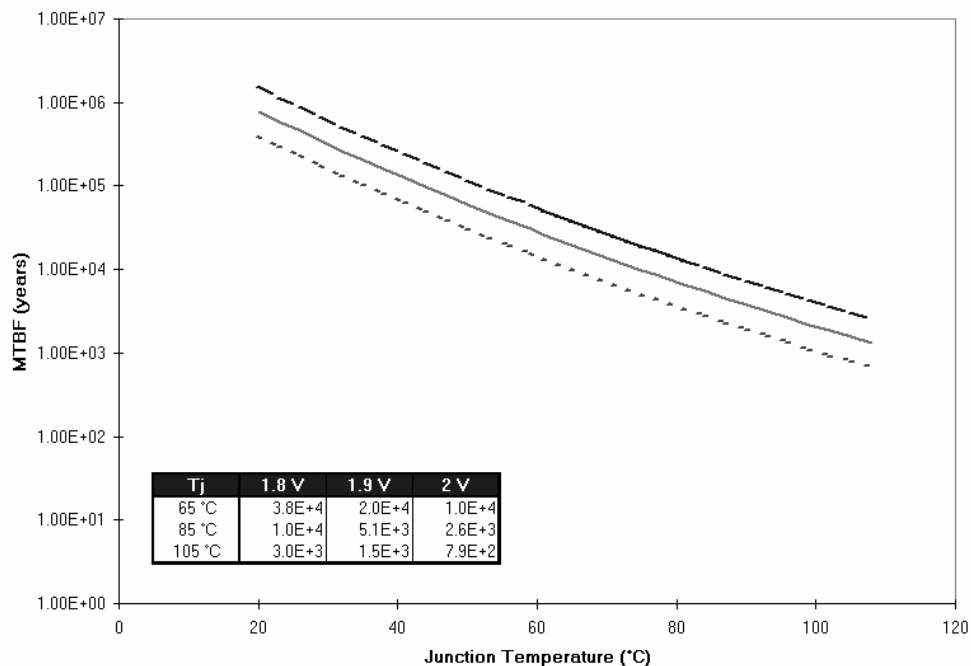
MPC8241/8245 Product FIT Rate and MTBF Derated Curves:



FITs vs Junction Temperature: 8241/8245
 Thermal and Voltage Acceleration
 eA = 0.7 eV, Beta = 6.67, 60% Confidence



MTBF vs Junction Temperature: 8241/8245
 Thermal and Voltage Acceleration
 eA = 0.7 eV, Beta = 6.67, 60% Confidence



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Revision History:

Revision History			
Revision	Date*	Comment	Author
Original	1/23/03	MC Qual Release	Leo Loc
A	3/31/03	Update 357PBGA (MPC860P) rel data	Leo Loc
B	4/22/04	Added Pb free package qual data.	Aaron Chapa
C	3/4/05	Corrected FIT rate title to reflect MC.	Aaron Chapa

Update Revision Date in Footer

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