MPC860/855T
357 PBGA

Qualification Report
Power QUICC Communications Processor

MPC860/855T Product Information:

Product / Technology / Fab / Package Description	
Device	MPC860/855T
Package	357 Lead PBGA (ZQ) & (VR), 25 x 25 mm
Mask Set	1K48M
Die Size	8.8773 x 8.5166 mm
Die Coating	Polyimide
Name/Location of Wafer Fab Facility	Freescale MOS 13 / Austin, Texas
Wafer Fab Process Technology	0.32um CDR2 w/CDR3 Backend
Poly / Metal layers	Single layer poly, 3 layer metal
Assembly Location	Freescale, KLM
Mold compound / Mfg. Supplier	Bi-phenyl mold compound
Die Attach Type	Conductive
Wire Material / Size	Au / 1.0 mil
Moisture Sensitivity Level	MSL3 245ºC
Substrate Suppliers	Suppliers A, B and C

MPC860/855T K48M MOS13 Reliability Summary:

Stress	Conditions	Read Points	Criteria	Results
Life Test (HTOL)	4.0 Volts Core 125ºC	5,10*, 20 Year Operating Life	0/1	0/240, 0/240, 0/240
Electrical Characterization	0ºC,25ºC,120ºC junction	Time zero	Meets Datasheet	Meets Datasheet
HTOL Drift Analysis	4.0 Volts Core 125ºC	10 Year Operating Life	Meets Datasheet	Meets Datasheet
ESD-HBM	2kV	-	0/1	0/9
ESD-CDM	500V	-	0/1	0/9
ESD-MM	200V	-	0/1	0/9
Latch Up	>200 mA + Inom (R)	-	0/1	0/9
Preconditioning (PC)	MSL3 30°C / 60%RH/245°C IR	192 hours	0/1	All units Pass
Temperature Humidity & Bias w/PC	85ºC, 85%R.H., 3.3 V	504, 1008* hours	0/1	0/227, 0/227
Temperature Cycle w/PC	-65ºC - 150ºC Air to Air	200, 500* cycles	0/1	0/160, 0/160

*** Required read point for qualification decision**

357 PBGA Package Reliability Summary:

357 PBGA ZQ package reliability data for substrate suppliers A,B, and C utilized the MCP860/855T MOS11 die. All stressing completed on 3 fab/assembly lots.

Stress	Conditions	Read Points	Criteria	Results
Temperature Cycle w/PC **Supplier A**	MSL3 30°C / 60%RH/245°C IR -65°C - 150°C Air to Air	192 hours 500* cycles	0/1 0/1	0/246 0/246
Temperature Humidity & Bias w/PC **Supplier A**	MSL3 30°C / 60%RH/245°C IR 85°C, 85%R.H., 3.3 V	192 hours 1008* hours	0/1 0/1	0/217 0/217
High Temperature Storage **Supplier A**	150°C Bake	504 hours 1008 hours	0/1 0/1	0/246 0/246
Temperature Cycle w/PC **Supplier B**	MSL3 30°C / 60%RH/245°C IR -65°C - 150°C Air to Air	192 hours 500* cycles	0/1 0/1	0/240 0/240
Temperature Humidity w/ No Bias w/PC **Supplier B**	MSL3 30°C / 60%RH/245°C IR 85°C, 85%R.H.	192 hours 1008* hours	0/1 0/1	0/240 0/240
Temperature Cycle w/PC **Supplier C**	MSL3 30°C / 60%RH/245°C IR -65°C - 150°C Air to Air	192 hours 500* cycles	0/1 0/1	0/239 0/239
Temperature Humidity w/ No Bias w/PC **Supplier C**	MSL3 30°C / 60%RH/245°C IR 85°C, 85%R.H.	192 hours 1008* hours	0/1 0/1	0/240 0/240

*** Required read point for qualification decision**

MPC860/855T K48M MOS13 Reliability Data:

Life test (HTOL) / 4.0 Core Voltage, 125°C			
Lot / Mask Set	240 Hours (5 year operating life)	480 Hours (10 year operating life)	936 Hours (20 year operating life)
D74838/1K48M	0/80	0/80	0/80
D74913/1K48M	0/80	0/80	0/80
D75179/1K48M	0/80	0/80	0/80
Totals	0/240	0/240	0/240

ESD / Latch Up				
Lot / Mask Set	HBM / 2.0 kV	MM / 200V	CDM / 500V – Un-Socketed	Latch-up / >200mA
D74838/1K48M	0/3	0/3	0/3	0/3
D74913/1K48M	0/3	0/3	0/3	0/3
D75179/1K48M	0/3	0/3	0/3	0/3
Totals	0/9	0/9	0/9	0/9

Electrical Characterization & HTOL Drift Analysis 0°C, 25°C and 120°C		
Lot/Mask Set	T0	480 Hours (10 year operating life)
D74838/1K48M	0/5	0/5
D74913/1K48M	0/5	0/5
D75179/1K48M	0/5	0/5
Totals	0/15	0/15
Comments		

Temperature Cycle / -65°C - 150°C Air to Air with Preconditioning @ MSL3/ 245°C IR		
Lot/Mask Set	200 Cycles	500 Cycles
D74838/1K48M	0/80	0/80
D75823/1K48M	0/80	0/80
Totals	0/160	0/160
Comments		

Temperature Humidity Bias / 85°C, 85%R.H., 3.3 V Nominal Bias with Preconditioning @ MSL3 / 245°C IR		
Lot/Mask Set	504 Hours	1008 Hours
D74838/1K48M	0/76	0/76
D74913/1K48M	0/71	0/71
D75179/1K48M	0/80	0/80
Totals	0/227	0/227
Comments		

MPC860 357 PBGA Cu Wire Qualification at Freescale Kuala Lumpur, Malaysia

Temperature Cycle / -55°C - 125°C Air to Air with Preconditioning @ MSL3/ 260°C		
Lot	400 Cycles	700 Cycles
Lot A	0/80	0/80
Lot B	0/80	0/80
Lot C	0/80	0/80
Totals	0/240	0/240

***QBS to MPC862B 357 PBGA Cu Wire Qualification**

Unbiased HAST / 110°C, 85% RH, 17.7 psia with Preconditioning @ MSL3/ 260°C	
Lot	264 hours
Lot A	0/80
Lot B	0/80
Lot C	0/80
Totals	0/240

***QBS to MPC862B 357 PBGA Cu Wire Qualification**

MSL3/ 260°C Characterization	
Lot	MSL3/ 260°C
Lot A	0/11
Lot B	0/11
Lot C	0/11
Totals	0/33

***QBS to MPC862B 357 PBGA Cu Wire Qualification**

Temperature Humidity Bias / 85°C, 85% RH, Nominal Bias with Preconditioning @ MSL3 / 260°C		
Lot	504 Hours	1008 Hours
Lot A	0/80	0/80
Lot B	0/80	0/80
Lot C	0/80	0/80
Totals	0/240	0/240

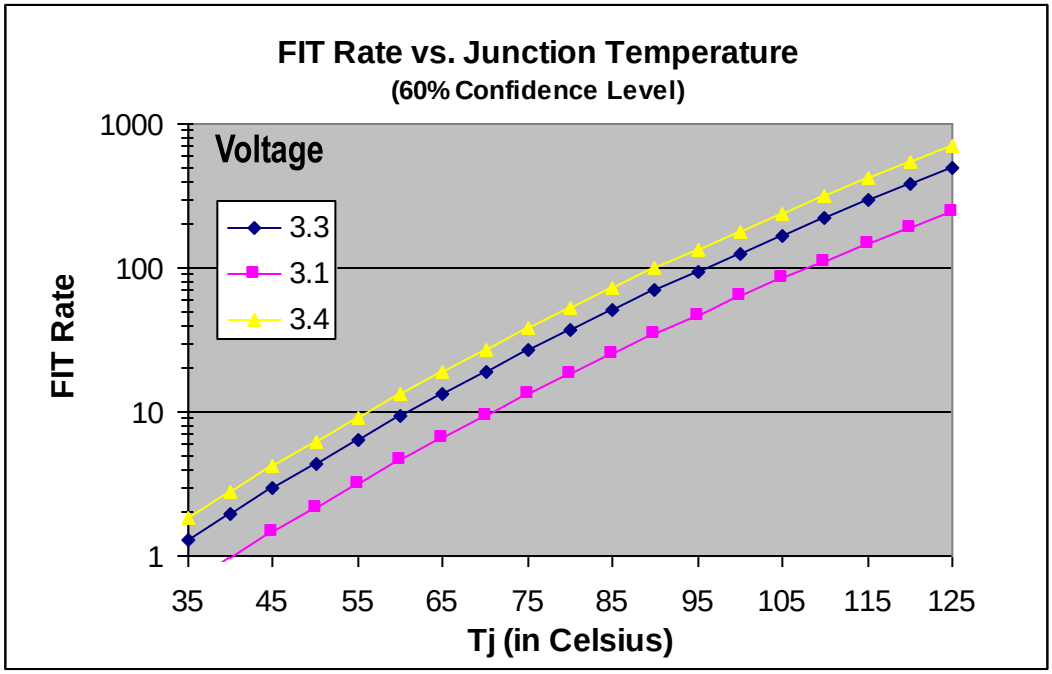
***QBS to 0.18NVM & 0.25NVM Technology Cu Wire Qualification**

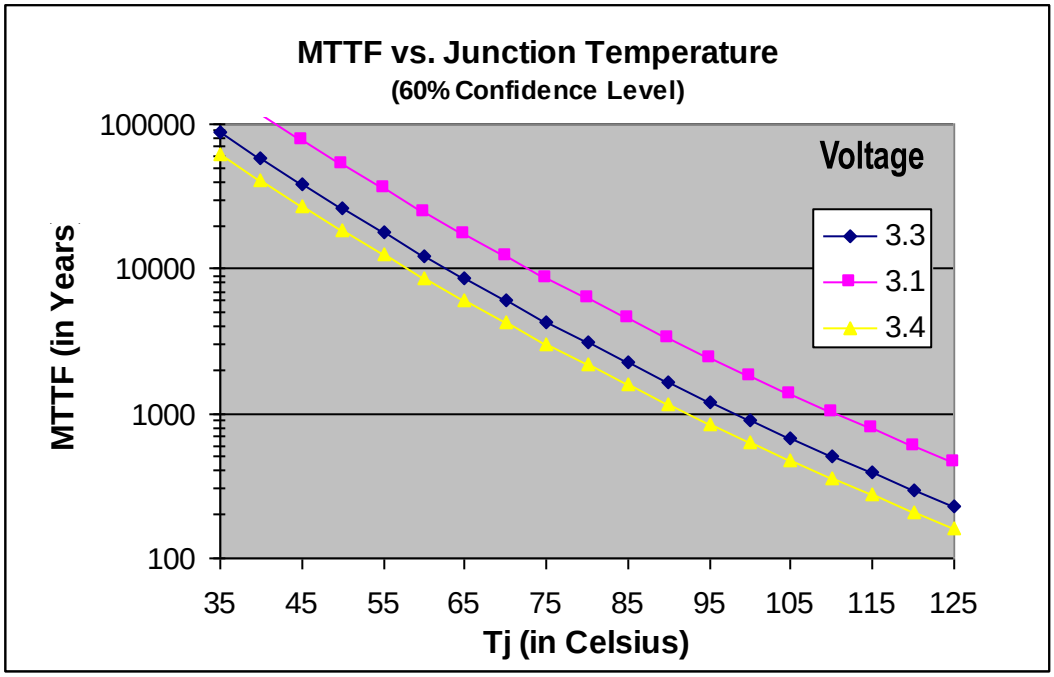
High Temperature Storage Life at 150 ºC		
Lot	504 Hours	1008 Hours
Lot A	0/80	0/80
Lot B	0/80	0/80
Lot C	0/80	0/80
Totals	0/240	0/240

***QBS to 0.18NVM & 0.25NVM Technology Cu Wire Qualification**

10 Year Operating Life FIT Rate and MTBF Graphs:

All data calculated at nominal conditions, 55ºC, 3.3 Volts, and 60% confidence.





Revision History:

Revision History			
Revision	Date	Comment	Author
Original	6/404	Original Qualification Report	Heather Rando
A	1/7/05	Added VR package code, 20 year HTOL data, and HTS stress results	Heather Rando
B	7/17/14	Added Cu Wire qualification data for MPC860 357 PBGA package	Navin Kumar