MPC862 Product Family
Qualification Report
Power QUICC Communications Processor

MPC862 Product Information:

Product / Technology / Fab / Package Description	
Package	357 Lead PBGA (ZP), 25 x 25 mm
Device	MPC862 Rev B Power QUICC
Mask Set	2K26A
Die Size	8.8773 x 8.5166 mm
Die Coating(s)	Polyimide
Name/Location of Die Fab Facility	MOS 11 and MOS 13 / Austin TX
Process Technology	0.32um CDR2, CDR3 BE
Poly / Metal layers	1P / 3M
Assembly Location	Freescale, KLM
Mold compound / Mfg. Supplier	Bi-phenyl mold compound
Die Attach Material	Conductive
Wire Material / Size	Au/ 1.0 mil Cu/ 0.9 mil
Moisture Sensitivity Level	MSL 3 / 245ºC Reflow
Substrate Supplier	Suppliers A, B, C and D

MPC862 Product Reliability Data Summary:

Includes data re-use from the 860 product qualification.

HTOL / Logic-4.0V, I/O-4.0V, 125ºC					
Lot / Mask Set	168 Hours	240 Hours	480 Hours	504 Hours	1008 Hours
WED837489900 MOS13	-	0 / 91	0 / 91	-	-
WED837493900 MOS13	-	0 / 73	0 / 73	-	-
WED772301001 MOS13	-	0 / 88	0 / 88	-	-
WED778001001 MOS13	-	0 / 132	0 / 132	-	-
WED782251001 MOS13	-	0 / 131	0 / 131	-	-
E40464 (2K26A) MOS11	0 / 76	-	-	-	-
E33832 (0K26A) MOS11	0 / 230	-	-	0 / 230	-
E91714 (H99G) MOS11	0 / 77	-	-	0 / 77	0 / 77
E94025 (0K20A) MOS11	0 / 80	-	-	0 / 80	0 / 80
E96514 (2K20A) MOS11	0 / 79	-	-	0 / 79	0 / 79
Totals	0 / 1057	0 / 981	0 / 981	0 / 466	0 / 236
Failure Comments					

ESD / Latch-up					
Lot / Mask Set	HBM / 2KV	MM / 200V	Latch-up / 200mA		
E91714 (H99G)	0 / 3	0 / 3	0 / 3		
E94025 (0K20A)	0 / 3	0 / 3	0 / 3		
E96514 (2K20A)	0 / 3	0 / 3	0 / 3		
Totals	0 / 9	0 / 9	0 / 9		
Failure Comments					

MPC862 357 Lead PBGA Package Reliability Data:

Includes data re-use from the 860 product qualification.

Supplemental 357 PBGA Package Reliability Data for High Temp Reflow / Pb Free Capability:

357 PBGA ZQ package reliability data for substrate suppliers A, B, and C utilized the MCP860/855T MOS11 die. Supplier D was qualified with the MCP860/855T MOS13 die. All stressing completed on 3 fab/3 assembly lots.

Stress	Conditions	Read Points	Criteria	Results
Temperature Cycle w/PC Supplier A	MSL3 30°C / 60%RH/245°C IR -65ºC - 150ºC 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 85ºC, 85%R.H., 3.3 V	192 hours 1008* hours	0/1 0/1	0/217 0/217
Temperature Cycle w/PC Supplier B	MSL3 30°C / 60%RH/245°C IR -65ºC - 150ºC 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 85ºC, 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 -65ºC - 150ºC 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 85ºC, 85%R.H.	192 hours 1008* hours	0/1 0/1	0/240 0/240
Temperature Cycle w/PC Supplier D	MSL3 30°C / 60%RH/245°C IR -65ºC - 150ºC Air to Air	192 hours 500* cycles	0/1 0/1	0/238 0/238
Highly Accelerated Stress Test w/PC Supplier D	MSL3 30°C / 60%RH/245°C IR 130ºC / 85% RH / 33.3 PSI / 3.3 Volts	192 hours 96* hours	0/1 0/1	0/240 0/240

*** Required read point for qualification decision**

MPC862 357 Lead PBGA Package Reliability Data (cont'd):

Includes data re-use from the 860 product qualification.

Original 357 PBGA Package Reliability Data:

Moisture Preconditioning Characterization - MSL 3 / 220ºC IR Reflow with CSAM					
Lot / Mask Set	MSL 3				
Totals	0 / 30				
Failure Comments					

Moisture Preconditioning - MSL 3 / 220ºC IR Reflow					
Lot / Mask Set	MSL 3				
Totals	0 / 495				
Failure Comments					

Temperature Cycle / -65ºC to 150ºC Air to Air with Preconditioning @ MSL 3 / 220ºC IR Reflow					
Lot / Mask Set	100 Cycles	500 Cycles	1000 Cycles		
Totals	0 / 231	0 / 228	0 / 227		
Failure Comments					

Temperature Humidity Bias / 85ºC, 85%R.H., Nominal Bias with Preconditioning @ MSL 3 / 220ºC IR Reflow					
Lot / Mask Set	168 Hours	504 Hours	1008 Hours		
Totals	0 / 230	0 / 154	0 / 154		
Failure Comments					

Autoclave / 121ºC, 100% RH, 15 PSIG with Preconditioning @ MSL 3 / 220ºC IR Reflow					
Lot / Mask Set	48 Hours	144 Hours			
Totals	0 / 231	0 / 231			
Failure Comments					

MPC862 357PBGA 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

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

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

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

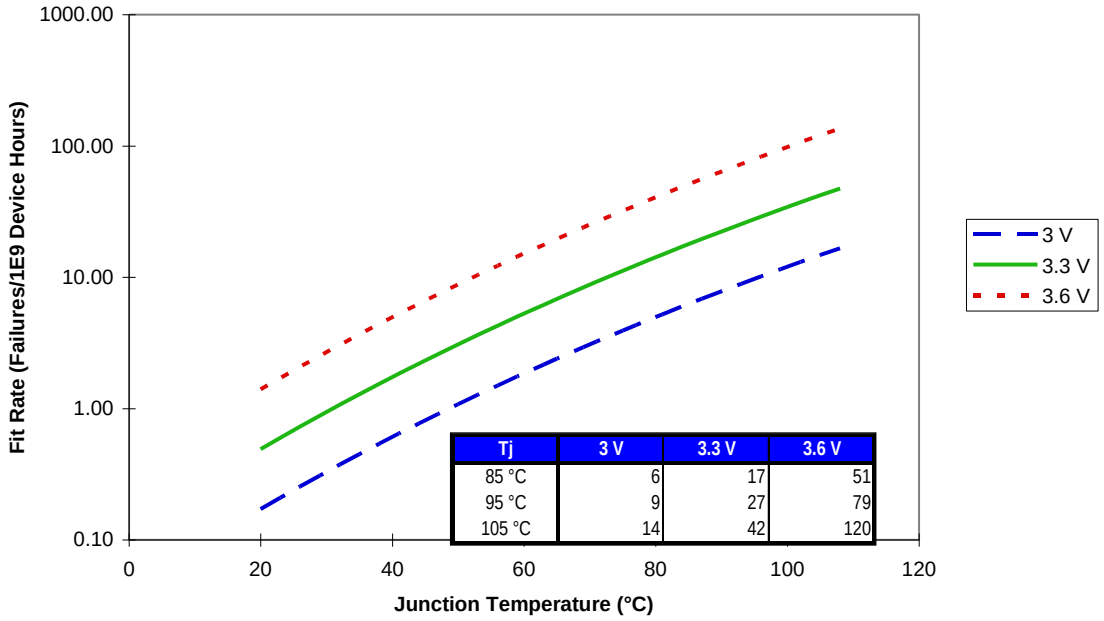
***QBS to 0.18NVM & 0.25NVM Technology Cu Wire Qualification**

High Temperature Storage Life at 150 °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**

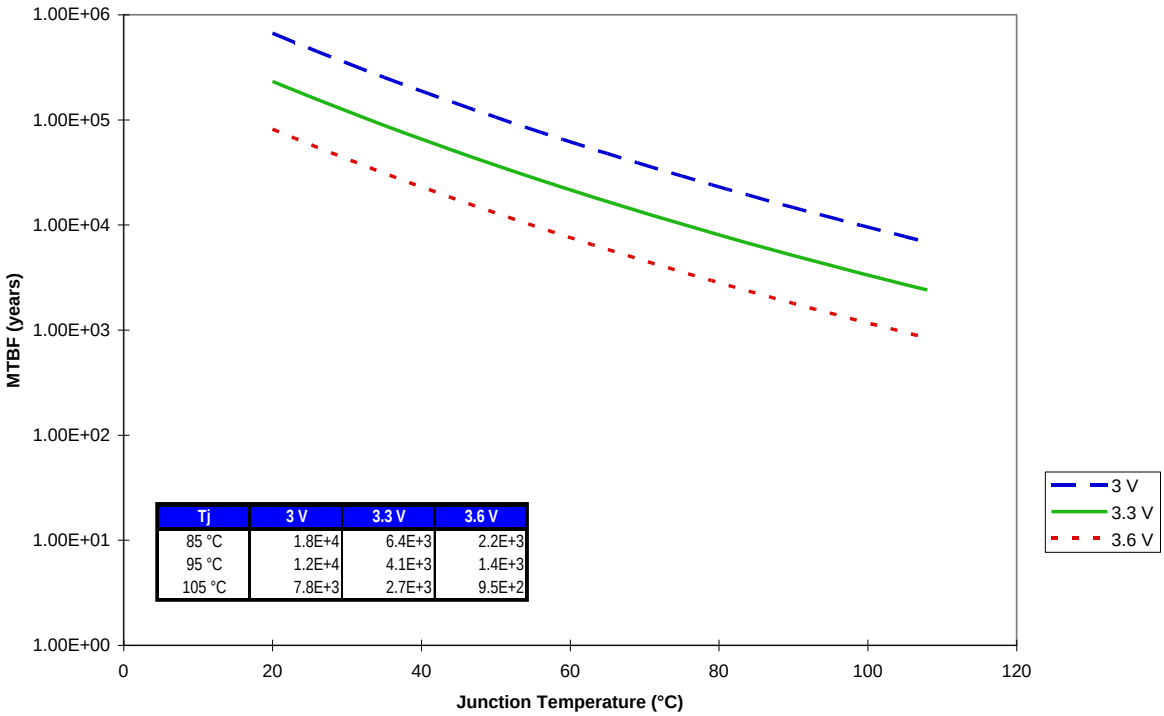
MPC862 Rev B Product FIT Rate and MTBF Derated Curves:

FITs vs Junction Temperature: MPC857DSL, 857T, 862P, 862T CDR2 Technology
Thermal and Voltage Acceleration
eA = 0.5 eV, Beta = 3.5, 60% Confidence



Tj	3 V	3.3 V	3.6 V
85 °C	6	17	51
95 °C	9	27	79
105 °C	14	42	120

MTBF vs Junction Temperature: MPC857DSL, 857T, 862P, 862T CDR2 Technology
Thermal and Voltage Acceleration
eA = 0.5 eV, Beta = 3.5, 60% Confidence



Tj	3 V	3.3 V	3.6 V
85 °C	1.8E+4	6.4E+3	2.2E+3
95 °C	1.2E+4	4.1E+3	1.4E+3
105 °C	7.8E+3	2.7E+3	9.5E+2

Revision History:

Revision History			
Revision	Date*	Comment	Author
Original	4/26/02	Original Rev B report.	Aaron Chapa
A	2/3/05	Converted Motorola references to Freescale, added all part numbers to FIT and MTBF charts.	Aaron Chapa
B	6/3/05	Added MOS 13 and high temp reflow qual data.	Aaron Chapa
C	7/17/14	Added Cu wire qualification data	Navin Kumar