



RELIABILITY REPORT

09/13/2006

| | |
|---------------------------------|--|
| CONTACT: | PRODUCT DESCRIPTION: |
| Micrel QA/REL (408) 435-3476 | Unisem Thin MLF Packages 10L ,8L, 6L and 4L |

| PRODUCT DETAILS | | | | | | | |
|-----------------|----------|----------|------|-------|----------|-------------|---------|
| QUAL VEHICLE : | PACKAGE: | ASSEMBLY | M/C | D/C | FAB LOC | LOT | PROCESS |
| MIC2214 JGYMT | MLF 10L | UNISEM | G770 | 0617Y | San Jose | 5A46473MEA | CSI 1.2 |
| MIC2289 15YMT | MLF 8L | UNISEM | G770 | 0618 | San Jose | 3A47061MEA | BCD2 |
| MIC5320 NNYMT | MLF 6L | UNISEM | G770 | 0618 | San Jose | 6A06693MNAH | CSI 0.5 |
| MIC94060 YMT | MLF 4L | UNISEM | G770 | 0621 | San Jose | 5A40776MEA | CSI 0.5 |

| PACKAGE DESCRIPTION: | | | | |
|----------------------|-------------|-------------|----------------|----------------------|
| PKG THICKNESS | LEAD FINISH | SINGULATION | MARKING METHOD | MOISTURE SENSITIVITY |
| .55 MIL | NiPdAu | SAWN | LASER | LEVEL 1 |

QUALIFICATION RESULTS:

| TEST DESCRIPTION | DEVICE NAME | MSL SOAK | LOT ID. | ATE Rej/pass | CSAM RESULTS DIE/PADDLE/LF |
|---|---------------|----------|---------|-----------------|-------------------------------|
| MSL Classification JEDEC-STD 020C 3X Reflow Tpeak=+260C | MIC2214 JGYMT | PREC.L1 | 0617Y | 0/384 | CSAM Pass |
| | MIC2289 15YMT | PREC.L1 | 0618 | 0/386 | CSAM Pass |
| | MIC5320 NNYMT | PREC.L1 | 0618 | 0/221 | CSAM Pass |
| | MIC94060 YMT | PREC.L1 | 0621 | 0/166 | CSAM Pass |

| TEST DESCRIPTION | DEVICE NAME | MSL SOAK | LOT ID. | 168 H Rej/pass | COMMENTS |
|--|---------------|----------|---------|-------------------|----------|
| PRESSURE POT Ta= +121°C/100%RH JESD22-102 Pre-conditioning @ +260C Peak 3X Reflow | MIC2214 JGYMT | PREC.L1 | 0617Y | 0/99 | |
| | MIC2289 15YMT | PREC.L1 | 0618 | 0/100 | |
| | MIC5320 NNYMT | PREC.L1 | 0618 | 0/45 | |
| | MIC94060 YMT | PREC.L1 | 0621 | 0/45 | |

| TEST DESCRIPTION | DEVICE NAME | MSL SOAK | LOT ID. | 500 cyc Rej/pass | COMMENTS | |
|---|---|---|-------------------------------|--|--|----------|
| TEMPERATURE CYCLE (AIR/AIR) COND. C -65°C / +150°C JESD22-A104 Pre-conditioning @ +260C Peak 3X Reflow | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT MIC94060 YMT | PREC.L1 PREC.L1 PREC.L1 PREC.L1 | 0617Y 0618 0618 0621 | 0/98 0/45 0/45 0/45 | | |
| TEST DESCRIPTION | DEVICE NAME | MSL SOAK | LOT ID. | 96 H Rej/pass | 500 H Rej/pass | COMMENTS |
| Humidity Bias Life Test JESD22-101 Ta = +85°C/85%RH Pre-conditioning @ +260C Peak 3X Reflow | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT | PREC.L1 PREC.L1 PREC.L1 | 0617Y 0618 0618 | 0/100 0/100 0/45 | 0/100 0/100 0/45 | |
| TEST DESCRIPTION | DEVICE NAME | MSL SOAK | LOT ID. | 500 H Rej/pass | 1000 H Rej/pass | COMMENTS |
| HTSL Storage Life Ta = +150°C JESD22-103 | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT | PREC.L1 PREC.L1 PREC.L1 | 0617Y 0618 0618 | 0/76 0/76 0/75 | | |
| PACKAGE RESULTS: | | | | | | |
| TEST DESCRIPTION | METHOD | DEVICE NAME | LOT ID. | RESULT | COMMENTS | |
| SOLDERABILITY | JESD22-B102D METHOD 1 CONDITION A +245°C | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT MIC94060 YMT | 0617Y 0618 0618 0621 | 0/5 Sn 0/5 Sn 0/5 Sn 0/5 Sn | | |
| SOLDERABILITY | JESD22-B102D METHOD 1 CONDITION A +215°C | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT MIC94060 YMT | 0617Y 0618 0618 0621 | 0/5 SnPb 0/5 SnPb 0/5 SnPb 0/5 SnPb | | |
| PHYSICAL DIMENSIONS | MIL-STD-883 TM.2016 | MIC2214 JGYMT MIC2289 15YMT MIC5320 NNYMT MIC94060 YMT | 0617Y 0618 0618 0621 | 0/1 0/1 0/1 0/1 | 3.0 x 3.0 2.0 x 2.0 1.6 x 1.6 1.6 x 1.2 | |
| FLAMMABILITY | UL-94V-0 Certified | All mold compounds used by Micrel meet this standard. See the UL website on-line list of material flammability certifications. Micrel requires a Certificate of Compliance from the assembly house and we verify the certifications on the web. | | | | |
| FORM #18-1185 REV: J PAGE 2 OF 5 | | | | | | |

LIFE TEST DATA FOR THIN MLF G770 M/C LEAD FREE 10L (3X3)

| TEST DESCRIPTION | DEVICE NAME | OPERATING MAX VOLTS | LOT ID. D/C | 168 H Rej/pass | 500 H Rej/pass | 1000 H Rej/pass | COMMENTS PROCESS |
|---|-----------------|------------------------|----------------|-------------------|-------------------|--------------------|---------------------|
| HTOL High Temperature Operating Life Test JESD22-A108 Ta= + 125°C | MIC2297 42YML | +10V | 0624 | 0/77 | | | BCD2 |
| | MIC2205 1.58YML | +5.5V | 0607 | 0/60 | 0/60 | 0/60 | CSI 0.5 |
| | MIC2205 1.58YML | +5.5V | 0607 | 0/58 | 0/58 | 0/58 | CSI 0.5 |
| | MIC2205 1.58YML | +5.5V | 0603 | 0/60 | 0/60 | | CSI 0.5 |
| | MIC2214 PSYML | +5.5V | 0551 | 0/77 | | 0/77 | CSI 1.2 |
| | MIC2205 YML | +5.5V | 0551 | 0/118 | 0/118 | 0/118 | CSI 0.5 |
| | MIC2285 YML | +5.5V | 0549 | 0/60 | 0/60 | 0/60 | CSI 0.5 |
| | MIC2245 YML | +5.5V | 0549 | 0/57 | 0/57 | 0/57 | CSI 0.5 |
| | MIC2285 YML | +5.5V | 0537 | 0/60 | | | CSI 0.5 |
| | MIC2245 YML | +5.5V | 0537 | 0/59 | | | CSI 0.5 |
| | MIC2205 1.85YML | +5.5V | 0534Y | 0/59 | 0/59 | 0/59 | CSI 0.5 |
| | MIC2214 JGYML | +5.5V | 0526 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2214 JGYML | +5.5V | 0526 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2214 JGYML | +5.5V | 0526 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2214 JGYML | +5.5V | 0526 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2205 YML | +5.5V | 0525 | 0/58 | 0/58 | 0/58 | CSI 0.5 |
| | MIC2214 PSYML | +5.5V | 0521 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2214 PSYML | +5.5V | 0521 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2214 PSYML | +5.5V | 0521 | 0/40 | 0/40 | 0/40 | CSI 1.2 |
| | MIC2224 YML | +5.5V | 0519 | 0/77 | 0/76 | 0/76 | CSI 0.5 |
| MIC2297 42YML | +10V | 0505 | 0/115 | 0/115 | 0/115 | BCD2 | |

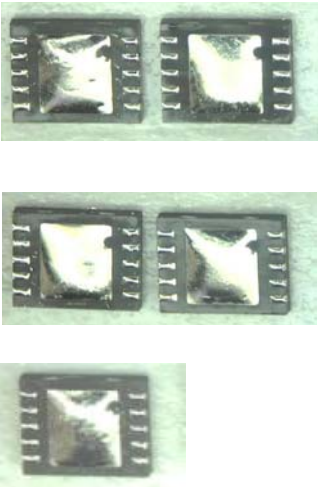
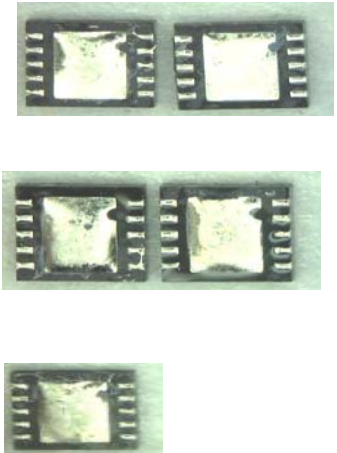
LIFE TEST DATA FOR THIN MLF G770 M/C LEAD FREE PACKAGE 4L (1.6x 1.2) & 6L (1.6 x 1.6)

| TEST DESCRIPTION | DEVICE NAME | OPERATING MAX VOLTS | LOT ID. D/C | 168 H Rej/pass | 500 H Rej/pass | 1000 H Rej/pass | COMMENTS PROCESS |
|---|-----------------|------------------------|----------------|-------------------|-------------------|--------------------|---------------------|
| HTOL High Temperature Operating Life Test JESD22-A108 Ta= + 125°C | MIC5320 NNYMT | +5.5V | 0618 | 0/77 | | 0/77 | CSI 0.5 |
| | MIC5320 MMYML | +5.5V | 0612 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC5319 YML | +5.5V | 0535 | 0/57 | 0/57 | 0/56 | CSI 0.5 |
| | MIC5319 YML | +5.5V | 0535 | 0/60 | 0/60 | 0/60 | CSI 0.5 |
| | MIC5319 YML | +5.5V | 0535 | 0/59 | 0/59 | | CSI 0.5 |
| | MIC5319 YML | +5.5V | 0535 | 0/60 | 0/60 | | CSI 0.5 |
| | MIC5318 2.85YML | +6.5V | 0624 | 0/77 | | | CSI 0.5 |
| | MIC5318 2.85YML | +6.0V | 0606 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC5305 DBML | +5.5V | 0618 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC5305 CBML | +5.5V | 0513 | 0/116 | 0/116 | 0/116 | CSI 0.5 |
| | MIC5305 2.9YML | +5.5V | 0524 | 0/60 | 0/60 | 0/60 | CSI 0.5 |
| | MIC5305 2.9YML | +5.5V | 0524 | 0/59 | 0/59 | 0/59 | CSI 0.5 |
| | MIC5305 2.9YML | +5.5V | 0520 | 0/116 | 0/116 | 0/116 | CSI 0.5 |
| | MIC5305 2.8YML | +5.5V | 0541 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC5305 2.5YML | +5.5V | 0520 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC5301 YML | +5.5V | 0622 | 0/77 | | 0/77 | CSI 0.5 |

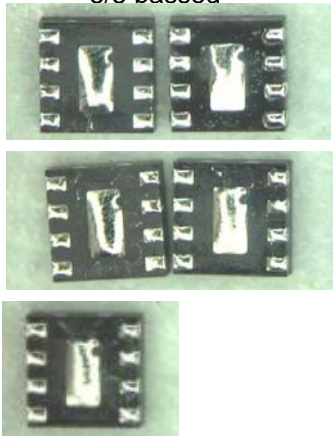
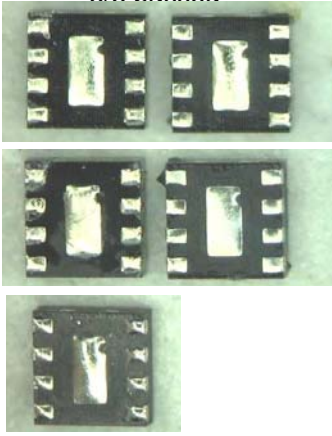
LIFE TEST DATA FOR THIN MLF G770 M/C LEAD FREE PACKAGE 8L (2x2)

| TEST DESCRIPTION | DEVICE NAME | OPERATING MAX VOLTS | LOT ID. D/C | 168 H Rej/pass | 500 H Rej/pass | 1000 H Rej/pass | COMMENTS PROCESS |
|--|----------------|---------------------|-------------|----------------|----------------|-----------------|------------------|
| HTOL High Temperature Operating Life Test JESD22-A108 Ta= + 125°C | MIC5310 MMYML | +5.5V | 0633 | 0/77 | | | CSI 0.5 |
| | MIC2289 24YML | +5.5V | 0627 | 0/77 | | | BCD2 |
| | MIC2294 34YML | +5.5V | 0620 | 0/60 | 0/60 | | BCD2 |
| | MIC2294 34YML | +5.5V | 0620 | 0/60 | 0/60 | | BCD2 |
| | MIC2287S 24YML | +5.5V | 0619 | 0/40 | | | BCD2 |
| | MIC2287S 24YML | +5.5V | 0618 | 0/40 | | | BCD2 |
| | MIC2287S 24YML | +5.5V | 0618 | 0/39 | | | BCD2 |
| | MIC5330 MFYML | +5.5V | 0611 | 0/77 | 0/77 | 0/77 | CSI 0.5 |
| | MIC2290 YML | +5.5V | 0611 | 0/77 | 0/77 | | BCD2 |
| | MIC5310 PPYML | +5.5V | 0606 | 0/77 | | | CSI 0.5 |
| | MIC2293 15YML | +5.5V | 0550 | 0/77 | 0/77 | 0/77 | BCD2 |
| | MIC5330 SJYML | +5.5V | 0549 | 0/59 | 0/59 | 0/59 | CSI 0.5 |
| | MIC5310 MFYML | +5.5V | 0549 | 0/60 | 0/60 | 0/60 | CSI 0.5 |
| | MIC5310SJ YML | +5.5V | 0536 | 0/64 | 0/64 | 0/64 | CSI 0.5 |
| | MIC5310MF YML | +5.5V | 0536 | 1/50 | | | CSI 0.5 |
| | MIC2287 24YML | +5.5V | 0533 | 0/60 | 0/60 | 0/60 | BCD2 |

10STSLP (3x3) NiPdAu lot

| Device | Date code | Post steamaging (1 Hr) 215C SnPb solder pot | Post steamaging (1 Hr) 245C Sn solder pot |
|---------------|-----------|---|--|
| MIC2214-JGYMT | 0617 | <p>5/5 passed</p>  | <p>5/5 passed</p>  |

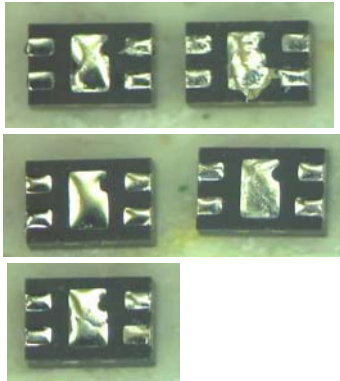
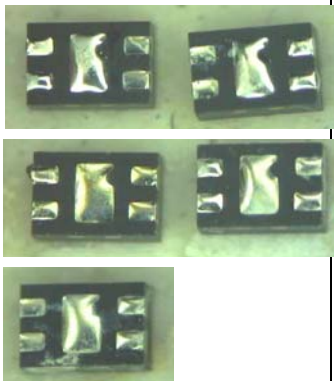
8STSLP (2x2) NiPdAu lot

| Device | Date code | Post steamaging (1 Hr) 215C SnPb solder pot | Post steamaging (1 Hr) 245C Sn solder pot |
|---------------|-----------|---|--|
| MIC2289-15YMT | 0618 | <p>5/5 passed</p>  | <p>5/5 passed</p>  |

6STSLP (1.6x1.6) NiPdAu lot

| Device | Date code | Post steamaging (8 Hrs) 215C SnPb solder pot | Post steamaging (8 Hrs) 245C Sn solder pot |
|---------------|-----------|---|---|
| MIC5320-NNYMT | 0618 | <p>5/5 passed</p> <p>(No images)</p> | <p>5/5 passed</p> <p>(No images)</p> |

4STSLP (1.6x1.2) NiPdAu lot

| Device | Date code | Post steamaging (1 Hr) 215C SnPb solder pot | Post steamaging (1 Hr) 245C Sn solder pot |
|-------------|-----------|---|--|
| MIC94060YMT | 0621 | <p>5/5 passed</p>  | <p>5/5 passed</p>  |