

6/25/2020



**RELIABILITY MONITOR REPORT
FOR**

Epson S18

MAXIM INTEGRATED

**160 RIO ROBLES
SAN JOSE, CA 95134**

**This Report was prepared by
MAXIM INTEGRATED Reliability Engineering**

Summary:

The data in the tables that follow was generated as the result of an on-going Process Reliability Monitor. The specific products in this process monitor are:

| | | | | |
|---------------|--------------|--------------|--------------|--------------|
| MAX14878AWA | MAX14878AWA | MAX20002ATPB | MAX20003TPB/ | MAX20012BATJ |
| MAX20024MGX | MAX20051AUD/ | MAX20076EATC | MAX20077ATCB | MAX20090AUP/ |
| MAX20428ATIA/ | MAX21610ATJA | MAX25201AETA | MAX25276ATC | MAX25601AATJ |
| MAX77686EWE | MAXM15067AM | MAXM17536AL | MAXM17712AM | MAXM17724AM |
| MAXM17724AM | | | | |

The calculated failure rate for devices using this process is:

FAILURE RATE: MTTF (YRS): 180997 QUANTITY: 1174 FAILS: 0 FITS: 0.6

The parameters used to calculate this failure rate are as follows:

Cf: 60% Ea: 0.7 Tu: 25 °C

The reliability data follows and in this section is the detailed reliability data by stress. The reliability data section includes the latest data available. This report covers data between 1/1/2020 and 3/31/2020 .

Process Information:

Process Description: Epson S18

OPERATING LIFE

| DESCRIPTION | DATE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | LOT NO. |
|-------------------|------|------------------|-----------|-----------|----------|-------|-------------|
| HIGH TEMP OP LIFE | 1838 | MAXM15067AMB+T | 125°C | 192 HRS | 80 | 0 | EBYQ6AAGAA |
| HIGH TEMP OP LIFE | 1849 | MAX20002ATPB/V+ | 125°C | 1000 HRS | 80 | 0 | EAZR0A162BA |
| HIGH TEMP OP LIFE | 1850 | MAX20428ATIA/VY+ | 125°C | 192 HRS | 80 | 0 | EBZX5Q001H |
| HIGH TEMP OP LIFE | 1850 | MAX20428ATIA/VY+ | 125°C | 1000 HRS | 40 | 0 | EBZX5Q001IA |
| HIGH TEMP OP LIFE | 1850 | MAX20428ATIA/VY+ | 125°C | 1000 HRS | 40 | 0 | EBZX5Q001IA |
| HIGH TEMP OP LIFE | 1850 | MAXM17724AMB+T | 125°C | 192 HRS | 46 | 0 | ECTM2Q00Q1 |
| HIGH TEMP OP LIFE | 1850 | MAXM17724AMB+ | 125°C | 192 HRS | 45 | 0 | ECTNM2Q00Q2 |
| HIGH TEMP OP LIFE | 1850 | MAXM17712AMB+T | 125°C | 192 HRS | 46 | 0 | ECTM3Q00Q3 |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 47 | 0 | EBUA6A028EA |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 32 | 0 | EBUA6A028EA |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 47 | 0 | EBUA6A028EB |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 33 | 0 | EBUA6A028EB |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 47 | 0 | EBUA6A028EC |
| HIGH TEMP OP LIFE | 1903 | MAXM17536ALY# | 125°C | 1000 HRS | 33 | 0 | EBUA6A028EC |
| HIGH TEMP OP LIFE | 1904 | MAX21610ATJA/V+ | 125°C | 1000 HRS | 80 | 0 | EBZZ2Q001K |
| HIGH TEMP OP LIFE | 1905 | MAX25276ATCA/VY+ | 125°C | 1000 HRS | 79 | 0 | EBNP3A012J |
| HIGH TEMP OP LIFE | 1907 | MAX25601AATJ/VY+ | 125°C | 1000 HRS | 80 | 0 | ECAD6Q001EQ |
| HIGH TEMP OP LIFE | 1911 | MAX25201AETA/VY+ | 125°C | 1000 HRS | 79 | 0 | ECAX2Q001FQ |

| | | | | | | | | |
|-------------------|------|-------------------|-------|------|-----|----|----------|-------------|
| HIGH TEMP OP LIFE | 1928 | MAX20076EATCB/VY+ | 125°C | 1000 | HRS | 80 | 0 | ECCU7Q002DQ |
| HIGH TEMP OP LIFE | 1944 | MAX20051AUD/V+CMS | 125°C | 1000 | HRS | 80 | 0 | EBWB7A143BX |
| Total: | | | | | | | 0 | |

STORAGE LIFE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | LOT NO. | |
|---------------|-----------|-------------------|-----------|-----------|----------|-------|-------------|--|
| STORAGE LIFE | 1849 | MAX20002ATPB/V+ | 150°C | 1000 HRS | 80 | 0 | EAZR0A162BA | |
| STORAGE LIFE | 1850 | MAX20428ATIA/VY+ | 150°C | 2000 HRS | 77 | 0 | EBZX5Q001I | |
| STORAGE LIFE | 1903 | MAXM17536ALY# | 150°C | 1000 HRS | 79 | 0 | EBUA6A028EB | |
| STORAGE LIFE | 1905 | MAX25276ATCA/VY+ | 150°C | 500 HRS | 80 | 0 | EBNP3A012J | |
| STORAGE LIFE | 1906 | MAX14878AWA+ | 150°C | 1000 HRS | 80 | 0 | NBRH4AS | |
| STORAGE LIFE | 1913 | MAX20024MGXXA/V+ | 150°C | 1000 HRS | 80 | 0 | EAUZ8A209D | |
| STORAGE LIFE | 1921 | MAX14878AWA+T | 150°C | 500 HRS | 80 | 0 | NBRH4AT | |
| STORAGE LIFE | 1921 | MAX14878AWA+T | 150°C | 500 HRS | 80 | 0 | NBRH4AU | |
| STORAGE LIFE | 1921 | MAX14878AWA+T | 150°C | 500 HRS | 80 | 0 | NBRH4AV | |
| STORAGE LIFE | 1944 | MAX20051AUD/V+CMS | 150°C | 96 HRS | 80 | 0 | EBWB7A143BX | |
| Total: | | | | | | | 0 | |

TEMPERATURE CYCLE

| DESCRIPTION | DATE CODE | TEST VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | LOT NO. |
|--------------------------------|-----------|------------------|--------------------------------|-----------|----------|-------|-------------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1823 | MAX20090AUP/V+ | -65C TO +150C (Condition C) | 1000 CYS | 10 | 0 | EBMS0A005FX |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1823 | MAX20090AUP/V+ | -65C TO +150C (Condition C) | 1000 CYS | 29 | 0 | EBMS0Q001IC |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1849 | MAX20002ATPB/V+ | -65C TO +150C (Condition C) | 1000 CYS | 80 | 0 | EAZR0A162BA |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1850 | MAX20428ATIA/VY+ | -65C TO +150C (Condition C) | 1000 CYS | 76 | 0 | EBZX5Q001H |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1850 | MAX20428ATIA/VY+ | -65C TO +150C (Condition C) | 1000 CYS | 79 | 0 | EBZX5Q001IA |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1903 | MAXM17536ALY# | -65C TO +150C (Condition C) | 1000 CYS | 80 | 0 | EBUA6A028EA |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1903 | MAXM17536ALY# | -65C TO +150C (Condition C) | 1000 CYS | 80 | 0 | EBUA6A028EB |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1903 | MAXM17536ALY# | -65C TO +150C (Condition C) | 1000 CYS | 80 | 0 | EBUA6A028EC |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1905 | MAX25276ATCA/VY+ | -65C TO +150C (Condition C) | 500 CYS | 80 | 0 | EBNP3A012J |

| | | | | | | | | |
|--------------------------------|------|-------------------|--------------------------------|------|-----|----|----------|-------------|
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1905 | MAX25276ATCA/VY+ | -65C TO +150C (Condition C) | 500 | CYS | 80 | 0 | EBNP3A012JA |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1905 | MAX25276ATCA/VY+ | -65C TO +150C (Condition C) | 1000 | CYS | 80 | 0 | EBNP3A012JB |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1906 | MAX14878AWA+ | -65C TO +150C (Condition C) | 1000 | CYS | 80 | 0 | NBRH4AS |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1907 | MAX20003TPB/V+CP7 | -65C TO +150C (Condition C) | 1000 | CYS | 79 | 0 | EZR0A193BX |
| TEMP CYCLE, 5' RAMP, 10' DWELL | 1944 | MAX20051AUD/V+CMS | -65C TO +150C (Condition C) | 1000 | CYS | 80 | 0 | EBWB7A143BX |
| Total: | | | | | | | 0 | |

TEMPERATURE HUMIDITY BIAS

| DESCRIPTION | DATE | TEST CODE | VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | LOT NO. | |
|-----------------|------|------------------|---------|----------------|-----------|----------|----------|---------|-------------|
| BIASED MOISTURE | 1823 | MAX20090AUP/V+ | | 130C, 85% R.H. | 96 | HRS | 45 | 0 | EBMS0Q001IA |
| BIASED MOISTURE | 1850 | MAX20428ATIA/VY+ | | 130C, 85% R.H. | 96 | HRS | 22 | 0 | EBZX5Q001H |
| BIASED MOISTURE | 1850 | MAX20428ATIA/VY+ | | 130C, 85% R.H. | 192 | HRS | 70 | 0 | EBZX5Q001H |
| BIASED MOISTURE | 1850 | MAX20428ATIA/VY+ | | 130C, 85% R.H. | 96 | HRS | 78 | 0 | EBZX5Q001I |
| BIASED MOISTURE | 1850 | MAX20428ATIA/VY+ | | 130C, 85% R.H. | 96 | HRS | 22 | 0 | EBZX5Q001IA |
| BIASED MOISTURE | 1850 | MAX20428ATIA/VY+ | | 130C, 85% R.H. | 192 | HRS | 70 | 0 | EBZX5Q001IA |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 1000 | HRS | 27 | 0 | EBUA6A028EA |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 130C, 85% R.H. | 96 | HRS | 28 | 0 | EBUA6A028EA |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 500 | HRS | 28 | 0 | EBUA6A028EA |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 1000 | HRS | 28 | 0 | EBUA6A028EB |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 130C, 85% R.H. | 96 | HRS | 28 | 0 | EBUA6A028EB |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 500 | HRS | 28 | 0 | EBUA6A028EB |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 1000 | HRS | 28 | 0 | EBUA6A028EC |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 500 | HRS | 28 | 0 | EBUA6A028EC |
| BIASED MOISTURE | 1903 | MAXM17536ALY# | | 85 C/85% R.H. | 500 | HRS | 27 | 0 | EBUA6A028EC |
| BIASED MOISTURE | 1905 | MAX25276ATCA/VY+ | | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBNP3A012J |
| BIASED MOISTURE | 1905 | MAX25276ATCA/VY+ | | 130C, 85% R.H. | 96 | HRS | 79 | 0 | EBNP3A012JA |
| BIASED MOISTURE | 1905 | MAX25276ATCA/VY+ | | 130C, 85% R.H. | 96 | HRS | 79 | 0 | EBNP3A012JB |
| BIASED MOISTURE | 1921 | MAX14878AWA+T | | 130C, 85% R.H. | 96 | HRS | 80 | 0 | NBRH4AT |
| Total: | | | | | | | 0 | | |

UNBIASED MOISTURE RESISTANCE

| DESCRIPTION | DATE | TEST CODE | VEHICLE | CONDITION | READPOINT | QUANTITY | FAILS | LOT NO. | |
|---------------|------|---------------|---------|----------------|-----------|----------|-------|---------|-------------|
| MOISTURE SOAK | 1903 | MAXM17536ALY# | | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBUA6A028EA |
| MOISTURE SOAK | 1903 | MAXM17536ALY# | | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBUA6A028EB |

| | | | | | | | | |
|---------------|------|------------------|----------------|----|-----|----|----------|-------------|
| MOISTURE SOAK | 1903 | MAXM17536ALY# | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBUA6A028EC |
| MOISTURE SOAK | 1905 | MAX25276ATCA/VY+ | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBNP3A012J |
| MOISTURE SOAK | 1905 | MAX25276ATCA/VY+ | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBNP3A012JA |
| MOISTURE SOAK | 1905 | MAX25276ATCA/VY+ | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EBNP3A012JB |
| MOISTURE SOAK | 1913 | MAX20024MGXXA/V+ | 130C, 85% R.H. | 96 | HRS | 80 | 0 | EAUZ8A109DA |
| MOISTURE SOAK | 1921 | MAX14878AWA+T | 130C, 85% R.H. | 96 | HRS | 80 | 0 | NBRH4AT |
| MOISTURE SOAK | 1921 | MAX14878AWA+T | 130C, 85% R.H. | 96 | HRS | 80 | 0 | NBRH4AU |
| MOISTURE SOAK | 1921 | MAX14878AWA+T | 130C, 85% R.H. | 96 | HRS | 80 | 0 | NBRH4AV |
| MOISTURE SOAK | 1951 | MAX77686EWE+ | 130C, 85% R.H. | 96 | HRS | 77 | 0 | EAEU3A410A |
| MOISTURE SOAK | 1951 | MAX77686EWE+ | 130C, 85% R.H. | 96 | HRS | 77 | 0 | EAEU3A410C |
| MOISTURE SOAK | 1951 | MAX77686EWE+ | 130C, 85% R.H. | 96 | HRS | 45 | 0 | EAEU3A410C |
| Total: | | | | | | | 0 | |

FAILURE RATE: MTTF (YRS): 180997 QUANTITY: 1174 FAILS: 0 FITS: 0.6