

## Qualification and Reliability Report

 Series: EA2025

| Qualification Tests                                     |   |      |      |      |
|---|---|------|------|------|
| Test  | Method/Condition  | Test | Pass | Fail |
| Aging   | Biased, 100μW typical, Temperature = 85°C, Duration = 30 days     | 100  | 100  | 0    |
| Autoclave   | JESD22-A102, 121°C, 100% RH, 15 PSIG, 96 hours                    | 100  | 100  | 0    |
| ESD Susceptibility                                      | MIL-STD-883, Method 3015, Class 1, HBM = 1,500V                   | 10   | 10   | 0    |
| Flammability  | UL94-V0   | 10   | 10   | 0    |
| Hermeticity – Fine Leak                                 | MIL-STD-883, Method 1014, Condition A                             | 100  | 100  | 0    |
| Hermeticity – Gross Leak                                | MIL-STD-883, Method 1014, Condition C                             | 100  | 100  | 0    |
| High Temperature Operating Life                         | MIL-STD-883, Method 1005, Condition B, Biased, 125°C, 1,000 hours | 100  | 100  | 0    |
| High Temperature Storage                                | MIL-STD-883, Method 1008, Condition C, 125°C, 168 hours           | 100  | 100  | 0    |
| Highly Accelerated Temperature and Humidity Stress Test | JESD22-A110, Biased, 130°C, 85% RH, 96 hours                      | 100  | 100  | 0    |
| Lead Integrity  | MIL-STD-883, Method 2004  | 25   | 25   | 0    |
| Mechanical Dimensions                                   | Per Datasheet   | 25   | 25   | 0    |
| Mechanical Shock  | MIL-STD-883, Method 2002, Condition B, 1,500G's, 0.5msec, ½ sine  | 100  | 100  | 0    |
| Moisture Sensitivity Level                              | J-STD-020, MSL = 1  | 100  | 100  | 0    |
| Resistance to Soldering Heat                            | MIL-STD-202, Method 210, Condition K                              | 100  | 100  | 0    |
| Resistance to Solvents                                  | MIL-STD-202, Method 215   | 100  | 100  | 0    |
| Solderability   | MIL-STD-883, Method 2003  | 100  | 100  | 0    |
| Temperature Cycle                                       | MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 cycles | 100  | 100  | 0    |
| Vibration   | MIL-STD-883, Method 2007, Condition A, 20G's                      | 100  | 100  | 0    |

| Reliability Tests |   |       |       |      |
|-------------------|---|-------|-------|------|
| Test              | Method/Condition  | Test  | Pass  | Fail |
| Vibration         | MIL-STD-883, Method 2007, 20 G's                                  | 8,215 | 8,215 | 0    |
| Mechanical Shock  | MIL-STD-883, Method 2002, Condition B, 1,500G's, 0.5msec, ½ sine  | 8,215 | 8,215 | 0    |
| Temperature Cycle | MIL-STD-883, Method 1010, Condition B, -55°C to +125°C, 10 cycles | 8,215 | 8,215 | 0    |
| Aging             | Biased, 100μW typical, Temperature = 85°C, Duration = 720 hours   | 8,215 | 8,215 | 0    |

| Reliability Data     |  |                         |
|----------------------|--|-------------------------|
| Characteristic       | Constant                                   | Value                   |
| Number of Units      | <i>N</i>                                   | 8,215                   |
| Hours Tested         | <i>t</i>                                   | 720                     |
| Activation Voltage   | <i>Ea</i>                                  | 0.4eV                   |
| Boltzmann's Constant | <i>k</i>                                   | 8.62 x 10 <sup>-5</sup> |
| Aging Temperature    | <i>T1</i>                                  | 85°C                    |
| Ambient Temperature  | <i>T2</i>                                  | 25°C                    |
| Confidence Level     | <i>X<sup>2</sup><sub>(CL, 2 dof)</sub></i> | 90%                     |

| Reliability Calculations    |                                      |
|-----------------------------|--------------------------------------|
| Parameter                   | Value                                |
| Failures in Time (FIT)      | 29 units / 1 x 10 <sup>9</sup> Hours |
| Mean Time To Failure (MTTF) | 34,925,000 hours / Failure           |

$$FIT = \frac{(\chi^2 / 2) \cdot 1,000,000,000}{\sum \left[ f_i \cdot t_i \cdot e^{\frac{Ea}{k} \left( \frac{1}{T1+273} - \frac{1}{T2+273} \right)} \right] + \left[ N \cdot t \cdot e^{\frac{Ea}{k} \left( \frac{1}{T1+273} - \frac{1}{T2+273} \right)} \right]}$$

$$MTTF = 1,000,000,000 / FIT$$