

## Reliability Results for Product Type PZU3.6B

Time period: Q1/2018 to Q4/2018

### Test Results

| AEC-Q101 Test  | Conditions   | Duration                          | Quantity  | Rejects   |
|--|--|-----------------------------------|-----------|-----------|
| <b>TEST</b>  |  |                                   |           |           |
| # 1 Pre- and Post-Stress Electrical Test                     | $T_{amb} = 25\text{ °C}$   | N/A                               | all parts | see below |
| # 2 <b>PC</b> Preconditioning                                | JESD22-A113<br>Bake $T_{amb} = 125\text{ °C}$<br>Soak $T_{amb} = 85\text{ °C}$ , RH = 85%<br>Reflow soldering              | 24 hours<br>168 hours<br>3 cycles | 37120     | 0         |
| # 5 <b>HTRB</b> High Temperature Reverse Bias                | MIL-STD-750-1<br>M1038 Method A<br>$T_j = T_{jmax}$ , $V_r = 100\%$ of max. datasheet reverse voltage                      | 1000 hours                        | 9200      | 0         |
| # 7 <b>TC</b> Temperature Cycling                            | JESD22-A104<br>$-55\text{ °C}$ to $T_{jmax}$ , not to exceed $150\text{ °C}$   | 1000 cycles                       | 9280      | 0         |
| # 8 <b>AC</b> Autoclave                                      | JESD22-A102<br>$T_{amb} = 121\text{ °C}$ , RH = 100 %<br>Pressure = 205 kPa (29.7 psia)                                    | 96 hours                          | 9280      | 0         |
| # 9 <b>H3TRB</b> High Humidity High Temperature Reverse Bias | JESD22-A101<br>$T_{amb} = 85\text{ °C}$ , RH = 85%, $V_R > 80\%$ of rated reverse voltage                                  | 1000 hours                        | 9280      | 0         |
| # 10 <b>IOL</b> Intermittent Operating Life                  | MIL-STD-750 Method 1037<br>$t_{on} = t_{off}$ , devices powered to insure<br>$\Delta T_j = 100\text{ °C}$ for 15000 cycles | 1000 hours                        | 9280      | 0         |
| # 20 <b>RSH</b> Resistance to Solder Heat                    | JESD22-A111<br>$260\text{ °C} \pm 5\text{ °C}$   | 10 s                              | 2340      | 0         |
| # 21 <b>SD</b> Solderability                                 | J-STD-002<br>Test method B and D   |                                   | 2280      | 0         |

### Calculation of FIT and MTBF

Test considered for FIT calculation: High Temperature Reverse Bias (HTRB, AEC-Q101 Test # 5)  
Confidence level 60%, derated to  $55\text{ °C}$ , activation energy 0.7 eV, test time 168 to 1000 hours

| Wafer Fab     | Technology | Quantity | Rejects | Failure Rate | MTBF         |
|---------------|------------|----------|---------|--------------|--------------|
| Nexperia DHAM | Zener      | 9200     | 0       | 0.46 FIT     | 247139 years |