

Reliability Investigation Results for Product Type BZX79-B68

Time period: Q4/2013 to Q3/2014

Test Results

| Test | Conditions | Duration | Quantity | Rejects | |
|------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------|-----------|
| # 1 | TEST Pre- and Post-Stress Electrical Test | $T_{amb} = 25\text{ °C}$ | N/A | all parts | see below |
| # 2 | PC Preconditioning | JESD22-A113 Bake $T_{amb} = 125\text{ °C}$ Soak $T_{amb} = 85\text{ °C}$, RH = 85% Reflow soldering | 24 hours 168 hours 3 cycles | 9480 | 0 |
| # 5 | HTRB High Temperature Reverse Bias | JESD22-A108 $T_j = T_{jmax}$, $V_R > 80\%$ of max. breakdown voltage | 1000 hours | 1360 | 0 |
| # 7 | TC Temperature Cycling | JESD22-A104 -55 °C to T_{jmax} | 1000 cycles | 4400 | 0 |
| # 8 | AC Autoclave | JESD22-A102 $T_{amb} = 121\text{ °C}$, RH = 100 % Pressure = 205 kPa (29.7 psia) | 96 hours | 1320 | 0 |
| # 9 | H3TRB High Humidity High Temperature Reverse Bias | JESD22-A101 $T_{amb} = 85\text{ °C}$, RH = 85%, $V_R > 80\%$ of rated breakdown voltage | 1000 hours | n.a. | n.a. |
| # 10 | IOL Intermittent Operating Life | MIL-STD-750 Method 1037 $t_{on} = t_{off}$, devices powered to insure $\Delta T_j = 125\text{ °C}$ for 7500 cycles or $\Delta T_j = 100\text{ °C}$ for 15000 cycles | 1000 hours | 3760 | 0 |
| # 20 | RSH Resistance to Solder Heat | JESD22-A111 / JESD22-B106 $260\text{ °C} \pm 5\text{ °C}$ | 10 s | 1240 | 0 |
| # 21 | SD Solderability | J-STD-002 $245\text{ °C} \pm 5\text{ °C}$ | 3 s | 1320 | 0 |

Calculation of FIT and MTBF

Test considered for FIT calculation: High Temperature Reverse Bias (HTRB, Test # 5)

Confidence level 60%, derated to 55 °C, activation energy 0.7 eV, test time 168 to 1000 hours

| Wafer Fab | Technology | Quantity | Rejects | Failure Rate | MTBF |
|-----------|--------------------|----------|---------|--------------|-------------|
| Phenitec | Zener / Protection | 1360 | 0 | 3.12 FIT | 36534 years |