# Reliability Results for Product Type NCR402T

**Time period:** Q4/2015 to Q3/2016

## Test Results

<table>
<thead>
<tr>
<th>AEC-Q101 Test</th>
<th>Conditions</th>
<th>Duration</th>
<th>Quantity</th>
<th>Rejects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong># 1 TEST</strong> Pre- and Post-Stress Electrical Test</td>
<td>$T_{\text{amb}} = 25 , ^{\circ}C$</td>
<td>N/A</td>
<td>all parts</td>
<td>see below</td>
</tr>
</tbody>
</table>
| **# 2 PC** Preconditioning | Bake $T_{\text{amb}} = 125 \, ^{\circ}C$  
Soak $T_{\text{amb}} = 85 \, ^{\circ}C$, RH = 85%  
Reflow soldering | 24 hours  
168 hours  
3 cycles | 26159 | 0 |
| **# 5 HTRB** High Temperature Reverse Bias | MIL-STD-750-1  
M1038 Method A  
$T_j = T_{j\text{max}}$, $V_r = 100\%$ of max. datasheet reverse voltage | 1000 hours | 6000 | 0 |
| **# 7 TC** Temperature Cycling | JESD22-A104  
-55 °C to $T_{j\text{max}}$, not to exceed 150°C | 1000 cycles | 6479 | 0 |
| **# 8 AC** Autoclave | $T_{\text{amb}} = 121 \, ^{\circ}C$, RH = 100 %  
Pressure = 205 kPa (29.7 psia) | 96 hours | 6560 | 0 |
| **# 9 H3TRB** High Humidity High Temperature Reverse Bias | JESD22-A101  
$T_{\text{amb}} = 85 \, ^{\circ}C$, RH = 85%, $V_r > 80\%$ of rated reverse voltage | 1000 hours | 6560 | 0 |
| **# 10 IOL** Intermittent Operating Life | MIL-STD-750 Method 1037  
$t_{\text{on}} = t_{\text{off}}$, devices powered to insure $\Delta T_j = 125 \, ^{\circ}C$ for 7500 cycles or $\Delta T_j = 100 \, ^{\circ}C$ for 15000 cycles | 1000 hours | 6560 | 0 |
| **# 20 RSH** Resistance to Solder Heat | JESD22-A111  
260 °C ± 5 °C | 10 s | 2340 | 0 |
| **# 21 SD** Solderability | J-STD-002  
Test method B and D | 1500 | | 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 °C, activation energy 0.7 eV, test time 168 to 1000 hours

<table>
<thead>
<tr>
<th>Wafer Fab</th>
<th>Technology</th>
<th>Quantity</th>
<th>Rejects</th>
<th>Failure Rate</th>
<th>MTBF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nexperia DHAM</td>
<td>Small Signal Bipolar</td>
<td>6000</td>
<td>0</td>
<td>0.71 FIT</td>
<td>161178 years</td>
</tr>
</tbody>
</table>

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