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Introduction

Corning Gilbert provides push-on interconnect solutions that are designed for blind mating and electrical performance when fully mated or mechanical misaligned. The push-on interface features ease of mating along with a high reliability electro-mechanical connection. This enables high density system flexibility while maintaining functionality from DC to 65 GHz.

![Figure 1 - Full Detent](image1.png)
![Figure 2 - Smooth Bore](image2.png)

**Detent features** are provided to retain the push-on connectors in the mated condition. Different levels of engage and disengage forces are accomplished by the stepped feature on the inside of the Shroud housing. Figure 1 shows the Full Detent interface which provides the highest mating forces and is recommended for use with cable connectors. Limited Detent interfaces are also available with reduced engage and disengage forces. Figure 2 shows the Smooth Bore interface which has the lowest mating forces (no stepped detent feature).

Module to module and board to board applications typically use a three connector system. One Blind-Mate Interconnect (BMI also know as a bullet) is mated between a Full Detent and a Smooth Bore Shroud. The Full Detent interface retains the BMI yet allows radial misalignment. The Smooth Bore interface allows misalignment in both radial and axial orientations.

Mechanical misalignment is the result of multiple component systems and the associated positional tolerances. **Axial misalignment** is the offset distance between the Shroud and BMI reference planes. For most connectors, coplanar reference planes provide the best electrical performance. Corning Gilbert can design connectors for optimal performance with a preset amount of axial misalignment. This enables good electrical performance with movement in both axial directions. **Radial misalignment** is the distance between the centerlines of the mated Shroud connectors. This is also known as gimbaling and is a directly related to the BMI length.

Figure 3 shows the BMI axially misaligned with an offset distance between the Shroud and BMI reference planes. The fully mated condition (no offset) is ideal for best electrical performance on most connectors.

![Figure 3 - Axial Misalignment](image3.png)
Figure 4 shows the BMI mated between two (2) connectors that are radially misaligned from centerline to centerline. The amount of radial misalignment is dependent upon the length and angle of the BMI. The GPO standard angle of 3° is mainly a function of the allowable connector housing movement.

Various configurations are available such as Blind-Mate Interconnects, printed circuit board connectors, cable connectors, and hermetic panel connectors. The GPO connectors are also functionally compliant with the SMP interface of MIL-PRF-31031. Performance and reliability make Corning Gilbert the push-on connector of choice.

1.0 Materials and Finishes

Tables 1A, 1B, and 1C show the standard materials and finishes used to manufacture Corning Gilbert push-on connectors. This includes various configurations across all of the product families (GPO, GPPO, G3PO, G4PO, and SGMS).

Table 1A - Metal Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>BeCu (Beryllium Copper)</td>
<td>ASTM B 196 and/or ASTM B 197</td>
</tr>
<tr>
<td>Brass</td>
<td>ASTM B 36, B121, B16, B16M</td>
</tr>
<tr>
<td>Stainless Steel (303)</td>
<td>ASTM A484/ A582 or A555/581</td>
</tr>
<tr>
<td>Iron-Nickel-Cobalt</td>
<td>ASTM F-15</td>
</tr>
</tbody>
</table>

Table 1B - Metal Finishes

<table>
<thead>
<tr>
<th>Finish</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold (75u in. Typ)</td>
<td>ASTM-B488 Type 1, Class 1.25</td>
</tr>
<tr>
<td>Nickel (100u in. Typ)</td>
<td>SAE AMS-QQ-N-290</td>
</tr>
</tbody>
</table>

Table 1C - Dielectric Materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virgin PTFE Fluorocarbon</td>
<td>ASTM D 1710 and ASTM D 1457</td>
</tr>
<tr>
<td>Polymide-Imide</td>
<td>ASTM D5204 Group 2 Class 1</td>
</tr>
<tr>
<td>Glass</td>
<td>Corning 7070 or Equivalent</td>
</tr>
</tbody>
</table>

The characteristics of the above materials enable the standard Storage and Operating Temperature Range of -65 °C to +165 °C.
2.0 GPO

2.1 GPO Detents – Full, Limited, and Smooth Bore

Table 2 shows the available GPO detents, typical engage / disengage forces, and mating cycles.

**Table 2 - GPO Detent Forces and Mating Cycles**

<table>
<thead>
<tr>
<th>Detent</th>
<th>GPO</th>
<th>Engage*</th>
<th>Disengage*</th>
<th>Cycles (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>7.0</td>
<td>9.0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Limited</td>
<td>5.0</td>
<td>7.0</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Smooth Bore</td>
<td>3.0</td>
<td>0.5</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

* The engage / disengage force values (shown in pounds) are typical and based upon actual data.

2.2 GPO Axial Misalignment

Figure 5 shows the GPO VSWR electrical performance versus frequency and axial misalignment.

**Figure 5 - GPO Axial Misalignment Performance**
2.3 GPO Radial Misalignment

Figure 6 shows the GPO VSWR electrical performance versus frequency and radial misalignment.

![Figure 6 - GPO Radial Misalignment Performance](image)

2.4 GPO VSWR and Insertion Loss

![Figure 7 - GPO BMI A1A1-0001-01](image)
0119-925-1
GPO Cable Connector

VSWR

Frequency (GHz)

Figure 8 - GPO Cable Connector 0119-925-1

Figure 8A - GPO Cable Connector VSWR Performance
3.0 GPPO

3.1 GPPO Detents – Full and Smooth Bore

Table 3 shows the available GPPO detents, typical engage / disengage forces, and mating cycles.

Table 3 - GPPO Detent Forces and Mating Cycles

<table>
<thead>
<tr>
<th>Detent</th>
<th>Engage*</th>
<th>Disengage*</th>
<th>Cycles (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>4.5</td>
<td>6.5</td>
<td>100</td>
</tr>
<tr>
<td>Smooth Bore</td>
<td>2.5</td>
<td>1.5</td>
<td>500</td>
</tr>
</tbody>
</table>

* The engage / disengage force values (shown in pounds) are typical and based upon actual data.

3.2 GPPO Axial Misalignment

Figure 9 shows the GPPO VSWR electrical performance versus frequency and axial misalignment.

![Figure 9 - GPPO Axial Misalignment Performance](image)
3.3 GPPO Radial Misalignment

![Figure 10 - GPPO Radial Misalignment Performance](image)

3.4 GPPO VSWR and Insertion Loss

![Figure 11 - GPPO BMI B1B1-0001-01](image)
Figure 11A - GPPO BMI VSWR Performance

Figure 11B - GPPO BMI Insertion Loss Performance
Figure 12 - GPPO Cable Connector B014-D11-01

Figure 12A - GPPO Cable Connector VSWR Performance
4.0 G3PO

4.1 G3PO Detents – Full and Smooth Bore

Table 4 shows the available G3PO detents, typical engage / disengage forces, and mating cycles.

**Table 4 – G3PO Detent Forces and Mating Cycles**

<table>
<thead>
<tr>
<th>Detent</th>
<th>G3PO</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engage*</td>
<td>Disengage*</td>
<td>Cycles (Min)</td>
<td></td>
</tr>
<tr>
<td>Full</td>
<td>2.5</td>
<td>4.5</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Smooth Bore</td>
<td>1.2</td>
<td>1.0</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

* The engage / disengage force values (shown in pounds) are typical and based upon actual data.

4.2 G3PO Axial Misalignment

Figure 13 shows the G3PO VSWR electrical performance versus frequency and axial misalignment.

**Figure 13 – G3PO Axial Misalignment Performance**
4.3 G3PO Radial Misalignment

Figure 14 shows the G3PO VSWR electrical performance versus frequency and radial misalignment.

4.4 G3PO VSWR and Insertion Loss
Figure 15A – G3PO BMI VSWR Performance

Figure 15B – G3PO BMI Insertion Loss Performance
Figure 16 – G3PO Cable Connector R014-B11-01

Figure 16A – G3PO Cable Connector VSWR Performance
5.0 G4PO

5.1 G4PO Detents – Full and Smooth Bore

Table 5 shows the available G4PO detents, typical engage / disengage forces, and mating cycles.

<table>
<thead>
<tr>
<th>Detent</th>
<th>G4PO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engage*</td>
</tr>
<tr>
<td>Full</td>
<td>.65</td>
</tr>
<tr>
<td>Smooth Bore</td>
<td>.20</td>
</tr>
</tbody>
</table>

* The engage / disengage force values (shown in pounds) are typical and based upon actual data.

5.2 G4PO VSWR

![G4PO BMI S1S1-0001-01](image)

Figure 17 – G4PO BMI S1S1-0001-01

![G4PO BMI VSWR Performance](image)

Figure 17A – G4PO BMI VSWR Performance
6.0 SGMS

6.1 SGMS Detents – Full and Smooth Bore

Table 6 shows the available SGMS detents, typical engage / disengage forces, and mating cycles.

Table 6 – SGMS Detent Forces and Mating Cycles

<table>
<thead>
<tr>
<th>Detent</th>
<th>SGMS</th>
<th>Engage*</th>
<th>Disengage*</th>
<th>Cycles (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited</td>
<td>4.5</td>
<td>6.0</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Smooth Bore</td>
<td>3.0</td>
<td>1.5</td>
<td></td>
<td>5000</td>
</tr>
</tbody>
</table>

* The engage / disengage force values (shown in pounds) are typical and based upon actual data.

6.2 SGMS Axial Misalignment

Figure 18 shows the SGMS VSWR electrical performance versus frequency and axial misalignment.

![Figure 18 – SGMS Axial Misalignment Performance](image-url)
6.3 SGMS Radial Misalignment

Figure 19 shows the SGMS VSWR electrical performance versus frequency and radial misalignment.

![Radial Misalignment Graph](image)

Figure 19 – SGMS Radial Misalignment Performance

6.4 SGMS VSWR and Insertion Loss

![SGMS BMI 1881-001-1](image)

Figure 20 – SGMS BMI 1881-001-1
Figure 20A – SGMS BMI VSWR Performance

Figure 20B – SGMS BMI Insertion Loss Performance
7.0 Electrical – GPO, GPPO, G3PO, G4PO, and SGMS

7.1 General Electrical Specifications

Table 7 – GPO, GPPO, G3PO, G4PO, and SGMS General Electrical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>GPO</th>
<th>GPPO</th>
<th>G3PO</th>
<th>G4PO</th>
<th>SGMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Withstanding Voltage (DWV)</td>
<td>500 Vrms</td>
<td>325 Vrms</td>
<td>250 Vrms</td>
<td>250 Vrms</td>
<td>1500 Vrms</td>
</tr>
<tr>
<td>Insulation Resistance (IR)</td>
<td>5000 MOhms @ 500 VDC</td>
<td>5000 MOhms @ 500 VDC</td>
<td>3500 MOhms @ 100 VDC</td>
<td>3500 MOhms @ 100 VDC</td>
<td>5000 MOhms @ 500 VDC</td>
</tr>
<tr>
<td>RF High Pot. @ 5 MHz</td>
<td>325 Vrms</td>
<td>200 Vrms</td>
<td>150 Vrms</td>
<td>150 Vrms</td>
<td>500 Vrms</td>
</tr>
<tr>
<td>Corona Level @ 70,000 ft</td>
<td>190 Vrms</td>
<td>125 Vrms</td>
<td>100 Vrms</td>
<td>100 Vrms</td>
<td>250 Vrms</td>
</tr>
<tr>
<td>Center Conductor Contact Resistance</td>
<td>6.0 mOhms max</td>
<td>6.0 mOhms max</td>
<td>6.0 mOhms max</td>
<td>6.0 mOhms max</td>
<td>6.0 mOhms max</td>
</tr>
</tbody>
</table>

7.2 Average Power Handling

![Average Power Ratings Graph](attachment:image.png)

Figure 21 - GPO, GPPO, G3PO, G4PO, and SGMS Average Power Handling
7.3 Temperature and Altitude De-rating

Table 8 – Typical Temperature and Altitude De-rating Factors

<table>
<thead>
<tr>
<th>TEMP DEG C</th>
<th>DERATING FACTOR</th>
<th>ALTITUDE X 1000'</th>
<th>DERATING FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.2</td>
<td>0</td>
<td>1.0</td>
</tr>
<tr>
<td>40</td>
<td>1.0</td>
<td>20</td>
<td>0.8</td>
</tr>
<tr>
<td>80</td>
<td>0.8</td>
<td>30</td>
<td>0.7</td>
</tr>
<tr>
<td>120</td>
<td>0.6</td>
<td>40</td>
<td>0.6</td>
</tr>
<tr>
<td>160</td>
<td>0.4</td>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>200</td>
<td>0.2</td>
<td>60</td>
<td>0.4</td>
</tr>
<tr>
<td>240</td>
<td>0.05</td>
<td>70</td>
<td>0.3</td>
</tr>
</tbody>
</table>

7.4 VSWR De-rating

Figure 22 – Typical VSWR De-rating Factors
8.1 GPO Tolerance Analysis

Figure 23 shows a typical GPO Board-to-Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board-to-Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

<table>
<thead>
<tr>
<th></th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board-to-Board</td>
<td>(0.4545 \pm 0.005)</td>
<td></td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>(-0.091 \pm 0.003)</td>
<td></td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>(-0.002 \pm 0.001)</td>
<td></td>
</tr>
<tr>
<td>Solder Thickness</td>
<td>(-0.002 \pm 0.001)</td>
<td></td>
</tr>
<tr>
<td>Shroud R/P to R/P</td>
<td>(0.2685 \pm 0.013)</td>
<td></td>
</tr>
</tbody>
</table>

The minimum Shroud R/P to R/P spacing is therefore \(0.2685 - 0.013 = 0.2555\). This dimension is also the maximum BMI Length. This ensures that the BMI doesn’t bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance \((0.0015)\). The nominal BMI Length is therefore \(0.2555 - 0.0015 = 0.254\).

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

<table>
<thead>
<tr>
<th></th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shroud R/P to Shroud R/P</td>
<td>(0.2685 \pm 0.013)</td>
<td></td>
</tr>
<tr>
<td>BMI Length</td>
<td>(-0.254 \pm 0.0015)</td>
<td></td>
</tr>
<tr>
<td>Gap</td>
<td>(0.0145 \pm 0.0145)</td>
<td></td>
</tr>
</tbody>
</table>

The tolerance analysis shows that the BMI can be flush \((0.0145 - 0.0145)\) to \(0.029 (0.0145 + 0.0145)\) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

![Figure 23 – GPO Board-to-Board Tolerance Analysis](image-url)
8.2 GPO Minimum Tolerance Analysis

Figure 24 shows the minimum GPO Board–to–Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board–to–Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Board–to–Board</td>
<td>.258 ± .005</td>
<td>.234 ± .009</td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>-.010 ± .001</td>
<td>-.224 ± .001</td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>-.010 ± .001</td>
<td>-.010 ± .010</td>
</tr>
<tr>
<td>Solder Thickness</td>
<td>-.002 ± .001</td>
<td>-.010 ± .010</td>
</tr>
</tbody>
</table>

The minimum Shroud R/P to R/P spacing is therefore .234 -.009 = .225. This dimension is also the maximum BMI Length. This ensures that the BMI doesn’t bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance (.001). The nominal BMI Length is therefore .225 -.001 = .224.

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shroud R/P to Shroud R/P</td>
<td>.234 ± .009</td>
<td>.234 ± .009</td>
</tr>
<tr>
<td>BMI Length</td>
<td>-.224 ± .001</td>
<td>-.224 ± .001</td>
</tr>
<tr>
<td>Gap</td>
<td>-.010 ± .010</td>
<td>-.010 ± .010</td>
</tr>
</tbody>
</table>

The tolerance analysis shows that the BMI can be flush (.010 -.010) to .020 (.010 + .010) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

Figure 24 – GPO Minimum Board–to–Board Tolerance Analysis
8.3 GPPO Tolerance Analysis

Figure 25 shows a typical GPPO Board–to–Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board–to–Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

\[
\begin{align*}
\text{Board–to–Board} & : 0.360 \pm 0.005 \\
\text{Shroud R/P} & : -0.067 \pm 0.002 \\
\text{Shroud R/P} & : -0.067 \pm 0.002 \\
\text{Solder Thickness} & : -0.002 \pm 0.001 \\
\text{Solder Thickness} & : -0.002 \pm 0.001 \\
\text{Shroud R/P to R/P} & : 0.222 \pm 0.011
\end{align*}
\]

The minimum Shroud R/P to R/P spacing is therefore $0.222 - 0.011 = 0.211$. This dimension is also the maximum BMI Length. This ensures that the BMI doesn’t bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance (0.001). The nominal BMI Length is therefore $0.211 - 0.001 = 0.210$.

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

\[
\begin{align*}
\text{Shroud R/P to Shroud R/P} & : 0.222 \pm 0.011 \\
\text{BMI Length} & : -0.210 \pm 0.001 \\
\text{Gap} & : 0.012 \pm 0.012
\end{align*}
\]

The tolerance analysis shows that the BMI can be flush ($0.012 - 0.012$) to $0.024$ ($0.012 + 0.012$) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

---

**Figure 25 – GPPO Board–to–Board Tolerance Analysis**
8.4 GPPO Minimum Tolerance Analysis

Figure 26 shows the minimum GPPO Board–to–Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board–to–Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

\[
\begin{align*}
\text{Board–to–Board} & \quad 0.196 \pm 0.005 \\
\text{Shroud R/P} & \quad 0.008 \pm 0.001 \\
\text{Shroud R/P} & \quad 0.008 \pm 0.001 \\
\text{Solder Thickness} & \quad 0.002 \pm 0.001 \\
\text{Solder Thickness} & \quad 0.002 \pm 0.001 \\
\text{Shroud R/P to R/P} & \quad 0.176 \pm 0.009
\end{align*}
\]

The minimum Shroud R/P to R/P spacing is therefore \(0.176 - 0.009 = 0.167\). This dimension is also the maximum BMI Length. This ensures that the BMI doesn't bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance (0.001). The nominal BMI Length is therefore \(0.167 - 0.001 = 0.166\).

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

\[
\begin{align*}
\text{Shroud R/P to Shroud R/P} & \quad 0.176 \pm 0.009 \\
\text{BMI Length} & \quad 0.166 \pm 0.001 \\
\text{Gap} & \quad 0.010 \pm 0.010
\end{align*}
\]

The tolerance analysis shows that the BMI can be flush (0.010 - 0.010) to 0.020 (0.010 + 0.010) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

![Figure 26 – GPPO Minimum Board–to–Board Tolerance Analysis](image-url)
8.5 G3PO Tolerance Analysis

Figure 27 shows a typical G3PO Board–to–Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board–to–Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

\[
\begin{align*}
0.1485 &\pm 0.002 \quad \text{Board–to–Board} \\
-0.020 &\pm 0.001 \quad \text{Shroud R/P} \\
-0.020 &\pm 0.001 \quad \text{Shroud R/P} \\
0.002 &\pm 0.001 \quad \text{Solder Thickness} \\
0.002 &\pm 0.001 \quad \text{Solder Thickness} \\
0.1045 &\pm 0.006 \quad \text{Shroud R/P to R/P}
\end{align*}
\]

The minimum Shroud R/P to R/P spacing is therefore \(0.1045 - 0.006 = 0.0985\). This dimension is also the maximum BMI Length. This ensures that the BMI doesn’t bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance (0.0005). The nominal BMI Length is therefore \(0.0985 - 0.0005 = 0.098\).

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

\[
\begin{align*}
0.1045 &\pm 0.006 \quad \text{Shroud R/P to Shroud R/P} \\
-0.098 &\pm 0.0005 \quad \text{BMI Length} \\
0.0065 &\pm 0.0065 \quad \text{Gap}
\end{align*}
\]

The tolerance analysis shows that the BMI can be flush (0.0065 - 0.0065) to 0.013 (0.0065 + 0.0065) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

Figure 27 – G3PO Board–to–Board Tolerance Analysis

Please contact Applications Engineering to configure the G3PO minimum board-to-board spacing of 0.120".
8.6 G4PO Tolerance Analysis

Figure 28 shows a typical G4PO Board–to–Board tolerance analysis using a surface mount configuration. The BMI Length and associated Gap are dependent on the Board–to–Board spacing, Shroud Reference Plane (R/P), and Solder Thickness.

Determine the Shroud R/P to Shroud R/P spacing as follows:

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board–to–Board</td>
<td>.122 ± .0015</td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>-.0235 ± .001</td>
</tr>
<tr>
<td>Shroud R/P</td>
<td>-.0235 ± .001</td>
</tr>
<tr>
<td>Solder Thickness</td>
<td>-.002 ± .001</td>
</tr>
<tr>
<td>Solder Thickness</td>
<td>-.002 ± .001</td>
</tr>
<tr>
<td>Shroud R/P to R/P</td>
<td>.071 ± .0055</td>
</tr>
</tbody>
</table>

The minimum Shroud R/P to R/P spacing is therefore .071 - .0055 = .0655. This dimension is also the maximum BMI Length. This ensures that the BMI doesn’t bottom out between the Shroud Reference Planes. The nominal BMI Length is the minimum R/P to R/P spacing minus the BMI Length tolerance (.0005). The nominal BMI Length is therefore .0655 - .0005 = .065.

Next, determine the Gap between the Smooth Bore Shroud R/P and the BMI as follows:

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shroud R/P to Shroud R/P</td>
<td>.071 ± .0055</td>
</tr>
<tr>
<td>BMI Length</td>
<td>-.065 ± .0005</td>
</tr>
<tr>
<td>Gap</td>
<td>.006 ± .006</td>
</tr>
</tbody>
</table>

The tolerance analysis shows that the BMI can be flush (.006 - .006) to .012 (.006 + .006) away from the Smooth Bore Shroud R/P. The Gap tolerance should be minimized whenever possible to ensure optimal electrical performance.

Figure 28 – G4PO Board–to–Board Tolerance Analysis

Please contact Applications Engineering to configure the G4PO minimum board-to-board spacing of .090".