

| | | | |
|---|-----------------------------|-------------------------------------|---------------------------|
| PCN Number: | 20191212001.2A | PCN Date: | April 13, 2020 |
| Title: | New Tray for Select Devices | | |
| Customer Contact: | PCN Manager | Dept: | Quality Services |
| Proposed 1st Ship Date: | July 14, 2020 | | |
| Change Type: | | | |
| <input type="checkbox"/> | Assembly Site | <input type="checkbox"/> | Assembly Process |
| <input type="checkbox"/> | Design | <input type="checkbox"/> | Electrical Specification |
| <input type="checkbox"/> | Test Site | <input checked="" type="checkbox"/> | Packing/Shipping/Labeling |
| <input type="checkbox"/> | Wafer Bump Site | <input type="checkbox"/> | Wafer Bump Material |
| <input type="checkbox"/> | Wafer Fab Site | <input type="checkbox"/> | Wafer Fab Materials |
| | | <input type="checkbox"/> | Part number change |
| <input type="checkbox"/> | | <input type="checkbox"/> | Assembly Materials |
| <input type="checkbox"/> | | <input type="checkbox"/> | Mechanical Specification |
| <input type="checkbox"/> | | <input type="checkbox"/> | Test Process |
| <input type="checkbox"/> | | <input type="checkbox"/> | Wafer Bump Process |
| <input type="checkbox"/> | | <input type="checkbox"/> | Wafer Fab Process |

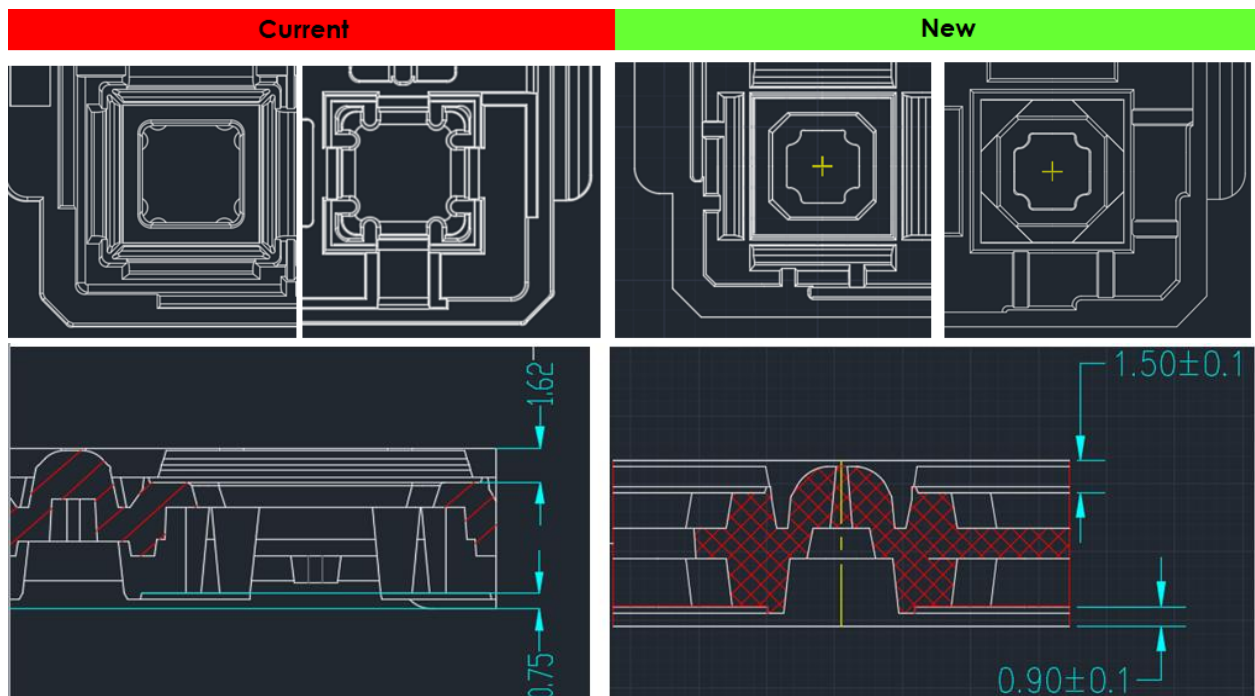
PCN Details

Description of Change:

Texas Instruments is pleased to announce the qualification of a new tray for the devices listed below. A comparison summary of the tray differences as follows:


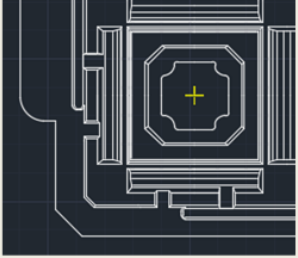
Group 1 Change Description - 14 x 14 TQFP Tray Change:

Tray Comparison Tables:



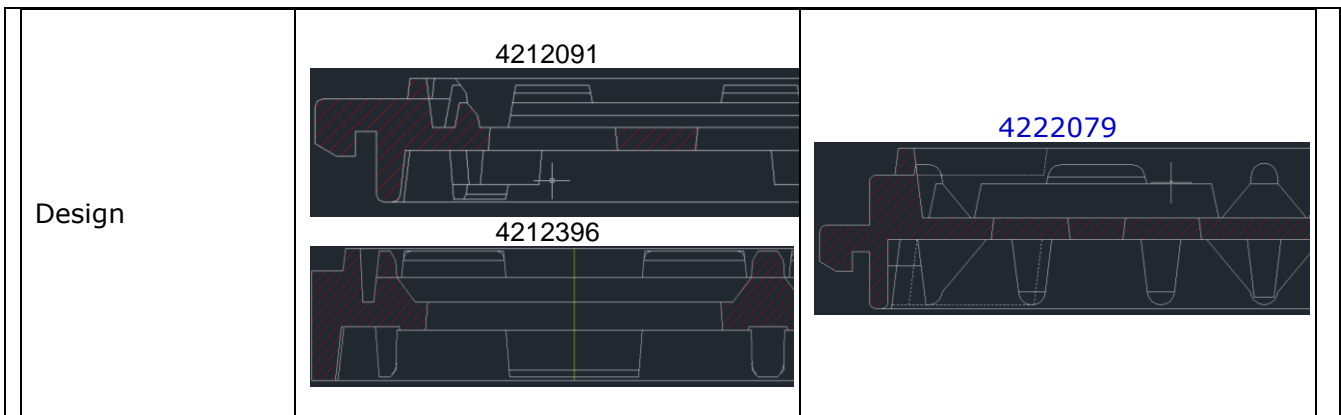
| | 4223432-0001 | 4224972-0001 |
|--------------|-----------------------------------|---------------------------------|
| Supplier | UBOT | Peak |
| Floor design | Circular square | Octagon |
| Cavity size | 16.55 +/- 0.08 | 16.10 +/- 0.08 |
| Seating ht | 1.62 mm (top) 0.75 mm (bottom) | 1.5 mm (top) 0.9 mm (bottom) |

Engineering Validation Results – Attribute Comparison

| | EXISTING | PROPOSED | COMMENT |
|--------------------------|---|--|----------|
| | 4223432-0001 | 4224972-0001 | CHANGE |
| * Supplier Part Number : | UQ1414 1.0 0615XB | ND 1414 1.0 0615 13 REV.G | CHANGE |
| * Gram Weight: | 155 | 157 | CHANGE |
| * Surface Resistivity : | 10 ⁴ - 10 ¹⁰ ohm/sq | 10 ⁴ - 10 ¹⁰ ohm/sq | UNCHANGE |
| * Package Size : | 14x14x1.0 | 14x14x1.0 | UNCHANGE |
| * Package Type : | TQFP | TQFP | UNCHANGE |
| Temperature Rating : | 150C | 150C | UNCHANGE |
| Matrix (Column X Rows) : | 06x15 | 06x15 | UNCHANGE |
| Fence design | Fillet | Fillet | UNCHANGE |
| Raw Material : | Carbon Fiber | Carbon Fiber | UNCHANGE |
| Color : | BLACK | BLACK | UNCHANGE |
| FLOOR DESIGN |  |  | CHANGE |

Group 2 Change Description – 23 X 23 BGA Tray Change:

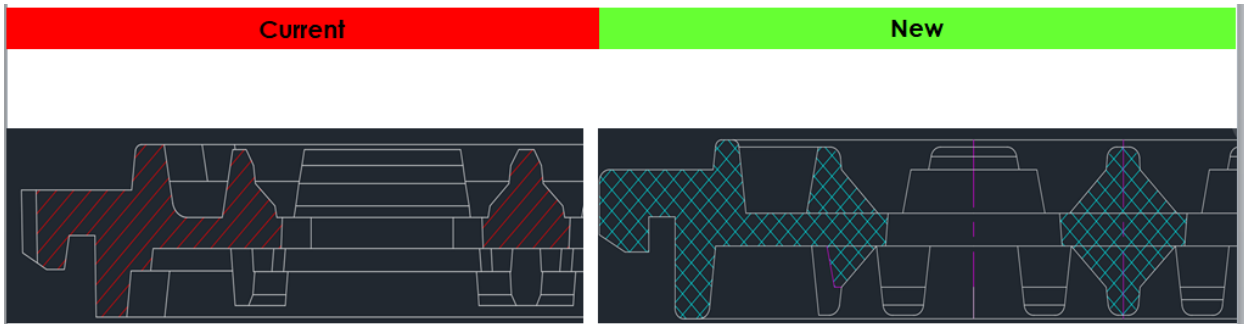
| What | From | To |
|------------------|--------------------------------|----------------|
| Stock #/Supplier | 4212091/Daewan, 4212396/Kostat | 4222079/Daewon |
| Weight | 100/104 grams | 169 grams |
| Thickness | 7.62mm | 12.19mm |
| Floor Design | "X", Square | "X" |
| Pocket Design | "X", Square | "X" |



DIMENSIONAL COMPARISON

| ITEM DESCRIPTION | CURRENT TRAY : 4212091-0001 | | | CURRENT TRAY :4212396-0001 | | | PROPOSED: 4222079-0001 | | | COMMENT |
|--|-----------------------------|--------------|--------------|----------------------------|--------------|--------------|---------------------------------|--------------|--------------|-----------|
| | DIM | Upper Limits | Lower Limits | DIM | Upper Limits | Lower Limits | DIM | Upper Limits | Lower Limits | |
| Overall Length | 322.6 | 322.85 | 322.35 | 322.6 | 322.85 | 322.35 | 322.6 | 322.85 | 322.35 | NO CHANGE |
| Layout Length | 315.0 | 315.25 | 314.75 | 315.0 | 315.25 | 314.75 | 315.0 | 315.25 | 314.75 | NO CHANGE |
| Layout Width | 135.9 | 136.15 | 135.65 | 135.9 | 136.15 | 135.65 | 135.9 | 136.15 | 135.65 | NO CHANGE |
| Layout Length on Top Stack frame | 311.15 | 311.40 | 311.02 | 311.15 | 311.40 | 311.02 | 311.15 | 311.40 | 311.02 | NO CHANGE |
| Layout Width on Top Stack frame | 132.08 | 132.33 | 131.95 | 132.08 | 132.33 | 131.95 | 132.08 | 132.33 | 131.95 | NO CHANGE |
| Layout Length on Bottom Stack frame | 311.66 | 311.91 | 311.53 | 311.66 | 311.91 | 311.53 | 311.66 | 311.91 | 311.53 | NO CHANGE |
| Layout Width on Bottom Stack frame | 132.59 | 132.84 | 132.46 | 132.59 | 132.84 | 132.46 | 132.59 | 132.84 | 132.46 | NO CHANGE |
| End Tab Length | 92.1 | 92.35 | 91.85 | 92.1 | 92.35 | 91.85 | 92.1 | 92.35 | 91.85 | NO CHANGE |
| Overall Height | 7.62 | 7.75 | 7.49 | 7.62 | 7.75 | 7.49 | 12.19 | 12.32 | 12.06 | CHANGE |
| Stack Height | 1.27 | 1.40 | 1.14 | 1.27 | 1.40 | 1.14 | 2.03 | 2.16 | 1.90 | CHANGE |
| Tray Matrix No. | 5x12 | | | 5x12 | | | 5x12 | | | NO CHANGE |
| Pitch M | 16.95 | 17.08 | 16.82 | 16.95 | 17.08 | 16.82 | 16.95 | 17.08 | 16.82 | NO CHANGE |
| Pitch M3 | 25.50 | 25.63 | 25.37 | 25.50 | 25.63 | 25.37 | 25.50 | 25.63 | 25.37 | NO CHANGE |
| Pitch M1 | 17.25 | 17.38 | 17.12 | 17.25 | 17.38 | 17.12 | 17.25 | 17.38 | 17.12 | NO CHANGE |
| Pitch M2 | 25.50 | 25.63 | 25.37 | 25.50 | 25.63 | 25.37 | 25.50 | 25.63 | 25.37 | NO CHANGE |
| Distance of tray singulation from corner of tray | 34.3 | 34.43 | 34.17 | 34.3 | 34.43 | 34.17 | 34.3 | 34.43 | 34.17 | NO CHANGE |
| Tray singulation width | 25.4 | 25.65 | 25.15 | 25.4 | 25.65 | 25.15 | 25.4 | 25.65 | 25.15 | NO CHANGE |
| Tray Lifting surface height | 2.54 | 2.67 | 2.41 | 2.54 | 2.67 | 2.41 | 2.54 | 2.67 | 2.41 | CHANGE |
| Cavity Size | 23.3 | 23.38 | 23.22 | 23.3 | 23.38 | 23.22 | 23.3 | 23.38 | 23.22 | NO CHANGE |
| Pedestal Design | Slope design | | | Slope design | | | Slope design with corner relief | | | CHANGE |
| Package seating height (Top) | 1.52 | 1.62 | 1.42 | 1.66 | 1.79 | 1.53 | 2.7 | 2.8 | 2.6 | CHANGE |
| Package seating height (Bottom) | 1.1 | 1.2 | 1 | 0.60 | 0.73 | 0.47 | 1.3 | 1.4 | 1.2 | CHANGE |

Group 3 Change Description - 13 x 13 BGA Tray Change:



| | 4212436-0001 | 4224857-0001 |
|-------------------|-----------------------------------|-----------------------------------|
| Supplier | UBOT | Peak |
| Tray Fence | Chamfered | Fillet |
| Cavity size (LSL) | 13.20 + 0.08 13.20 - 0.04 | 13.30 + 0.08 13.30 - 0.08 |
| Seating ht | 1.64 mm (top) 2.00 mm (bottom) | 1.27 mm (top) 1.37 mm (bottom) |

| MATERIAL DESCRIPTION | EXISTING | PROPOSED | COMMENT |
|--------------------------|------------------|------------------------|--------------|
| | | 4212436-0001 | 4224857-0001 |
| * Supplier Name : | UBOT | Peak | CHANGE |
| * Supplier Part Number : | UB13131.40820XB | NX BG1313 1.74 0820 13 | CHANGE |
| * Gram Weight: | 110 | 132.5 | CHANGE |
| * Surface Resistivity : | 1 exp5 - 1 exp11 | 1 exp5 - 1 exp11 | NO CHANGE |
| * Package Size : | 13x13 | 13x13 | NO CHANGE |
| * Package Type : | BGA | BGA | NO CHANGE |
| Temperature Rating : | 150C | 150C | NO CHANGE |
| Matrix (Column X Rows) : | 8x20 | 8x20 | NO CHANGE |
| Raw Material : | Carbon fiber | Carbon fiber | NO CHANGE |
| Thickness : | 7.62 mm | 7.62 | NO CHANGE |
| Color : | BLACK | BLACK | NO CHANGE |
| Floor Design | Yes | Yes | NO CHANGE |

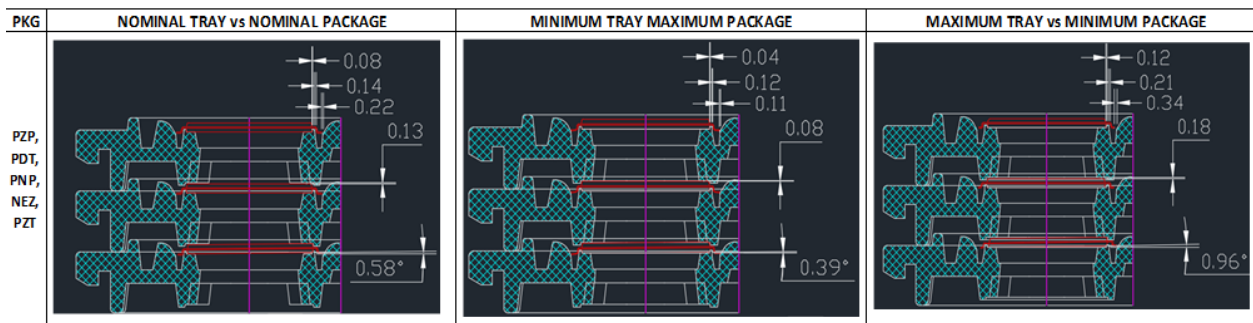
| ITEM DESCRIPTION | 4212436-0001 UB13131.40820XB | | | 4224857-0001 NX BG1313 1.74 0820 13 | | | COMMENT |
|--|---------------------------------|--------------|--------------|--|--------------|--------------|-----------|
| | DIM | Upper Limits | Lower Limits | DIM | Upper Limits | Lower Limits | |
| | Overall Length | 322.6 | 322.85 | 322.35 | 322.6 | 322.85 | |
| Layout Length | 315.0 | 315.25 | 314.75 | 315.0 | 315.25 | 314.75 | NO CHANGE |
| Layout Width | 135.9 | 136.15 | 135.65 | 135.9 | 136.15 | 135.65 | NO CHANGE |
| Layout Length on Top Stack frame | 311.15 | 311.40 | 311.02 | 311.15 | 311.40 | 311.02 | NO CHANGE |
| Layout Width on Top Stack frame | 132.08 | 132.33 | 131.95 | 132.08 | 132.33 | 131.95 | NO CHANGE |
| Layout Length on Bottom Stack frame | 311.66 | 311.91 | 311.53 | 311.66 | 311.91 | 311.53 | NO CHANGE |
| Layout Width on Bottom Stack frame | 132.59 | 132.84 | 132.46 | 132.59 | 132.84 | 132.46 | NO CHANGE |
| End Tab Length | 92.1 | 92.35 | 91.85 | 92.1 | 92.35 | 91.85 | NO CHANGE |
| Overall Height | 7.62 | 7.75 | 7.49 | 7.62 | 7.75 | 7.49 | NO CHANGE |
| Stack Height | 1.27 | 1.40 | 1.14 | 1.27 | 1.40 | 1.14 | NO CHANGE |
| Tray Matrix No. | 08x20 | | | 08x20 | | | NO CHANGE |
| Pitch M | 15.45 | 15.58 | 15.32 | 15.45 | 15.58 | 15.32 | NO CHANGE |
| Pitch M3 | 15.00 | 15.13 | 14.87 | 15.00 | 15.13 | 14.87 | NO CHANGE |
| Pitch M1 | 15.00 | 15.13 | 14.87 | 15.00 | 15.13 | 14.87 | NO CHANGE |
| Pitch M2 | 15.00 | 15.13 | 14.87 | 15.00 | 15.13 | 14.87 | NO CHANGE |
| Distance of tray singulation from corner of tray | 34.30 | 34.55 | 34.05 | 34.30 | 34.55 | 34.05 | NO CHANGE |
| Tray singulation width | 25.40 | 25.53 | 25.27 | 25.40 | 25.53 | 25.27 | NO CHANGE |
| Tray Lifting surface height | 2.54 | 2.67 | 2.41 | 2.54 | 2.67 | 2.41 | NO CHANGE |
| Cavity Size (X) | 13.20 | 13.28 | 13.16 | 13.30 | 13.38 | 13.22 | CHANGE |
| Cavity Size (Y) | 13.20 | 13.28 | 13.16 | 13.30 | 13.38 | 13.22 | CHANGE |
| Pedestal Design | SLOPE | | | SLOPE | | | NO CHANGE |
| Package seating height (Top) | 1.64 | 1.71 | 1.57 | 1.27 | 1.37 | 1.17 | CHANGE |
| Package seating height (Bottom) | 2.00 | 2.05 | 1.92 | 1.35 | 1.45 | 1.25 | CHANGE |

Reason for Change:

| |
|---|
| New tray offers improved centering of device in tray pocket |
| Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative): |
| None |

| | | | | | | | | | | | | | | | | | | | | |
|--|------------------|-------------------|-------------------|-------------------|----------------|------------------|-------------------|---------------|---------------|------------------|------------------|---------------|----------------|------------------|------------------|---------------|----------------|------------------|-------------------|--|
| Changes to product identification resulting from this PCN: | | | | | | | | | | | | | | | | | | | | |
| New tray | | | | | | | | | | | | | | | | | | | | |
| Product Affected: | | | | | | | | | | | | | | | | | | | | |
| Group 1 Device list: | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>PCOBCG904NBPNP</td> <td>PTPS99000ACPZP</td> <td>TMS320F28069FPZPQ</td> <td>TMS320F28377SPZPQ</td> </tr> <tr> <td>PCOBRCG904PNPR</td> <td>TMS320F28062PZPQ</td> <td>TMS320F28069MPZPQ</td> <td>TPS9900TPZPQ1</td> </tr> <tr> <td>PCOBRCG904PNQ</td> <td>TMS320F28065PZPQ</td> <td>TMS320F28069PZPQ</td> <td>TPS9901TPZPQ1</td> </tr> <tr> <td>PTPS99000AAPZP</td> <td>TMS320F28066PZPQ</td> <td>TMS320F28075PZPQ</td> <td>TVP5158IPNPQ1</td> </tr> <tr> <td>PTPS99000ABPZP</td> <td>TMS320F28067PZPQ</td> <td>TMS320F28375SPZPQ</td> <td></td> </tr> </table> | PCOBCG904NBPNP | PTPS99000ACPZP | TMS320F28069FPZPQ | TMS320F28377SPZPQ | PCOBRCG904PNPR | TMS320F28062PZPQ | TMS320F28069MPZPQ | TPS9900TPZPQ1 | PCOBRCG904PNQ | TMS320F28065PZPQ | TMS320F28069PZPQ | TPS9901TPZPQ1 | PTPS99000AAPZP | TMS320F28066PZPQ | TMS320F28075PZPQ | TVP5158IPNPQ1 | PTPS99000ABPZP | TMS320F28067PZPQ | TMS320F28375SPZPQ | |
| PCOBCG904NBPNP | PTPS99000ACPZP | TMS320F28069FPZPQ | TMS320F28377SPZPQ | | | | | | | | | | | | | | | | | |
| PCOBRCG904PNPR | TMS320F28062PZPQ | TMS320F28069MPZPQ | TPS9900TPZPQ1 | | | | | | | | | | | | | | | | | |
| PCOBRCG904PNQ | TMS320F28065PZPQ | TMS320F28069PZPQ | TPS9901TPZPQ1 | | | | | | | | | | | | | | | | | |
| PTPS99000AAPZP | TMS320F28066PZPQ | TMS320F28075PZPQ | TVP5158IPNPQ1 | | | | | | | | | | | | | | | | | |
| PTPS99000ABPZP | TMS320F28067PZPQ | TMS320F28375SPZPQ | | | | | | | | | | | | | | | | | | |
| Group 2 Device list: | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>TDA2HFBTQABCQ1</td> <td>XDRA726BXDEABC</td> <td>XDRA726BXGABC</td> <td>XDRA726BXGABCH</td> </tr> <tr> <td>TDA2SABRQABCQ1</td> <td></td> <td></td> <td></td> </tr> </table> | TDA2HFBTQABCQ1 | XDRA726BXDEABC | XDRA726BXGABC | XDRA726BXGABCH | TDA2SABRQABCQ1 | | | | | | | | | | | | | | | |
| TDA2HFBTQABCQ1 | XDRA726BXDEABC | XDRA726BXGABC | XDRA726BXGABCH | | | | | | | | | | | | | | | | | |
| TDA2SABRQABCQ1 | | | | | | | | | | | | | | | | | | | | |
| Group 3 Device list: | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <td>OMAPL138EZCEQ4</td> </tr> </table> | OMAPL138EZCEQ4 | | | | | | | | | | | | | | | | | | | |
| OMAPL138EZCEQ4 | | | | | | | | | | | | | | | | | | | | |

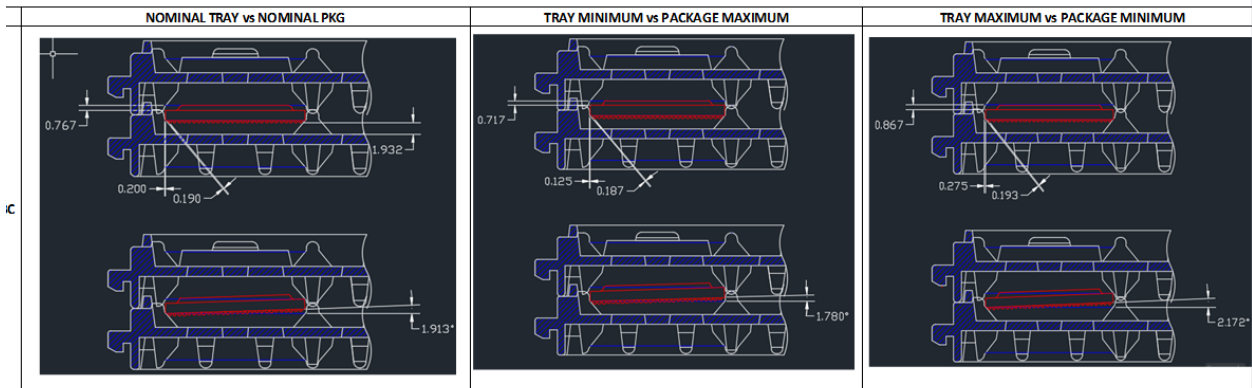
Group 1 Device Fit Analysis:
FIT ANALYSIS



- X and Y clearance is not greater than 0.5 mm
- Rotation angle is less than 10 degrees

Group 2 Device Fit Analysis:

FIT ANALYSIS

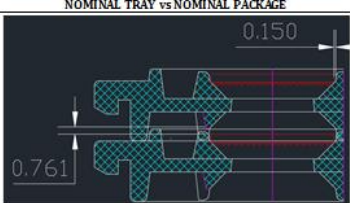
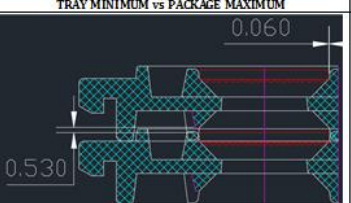
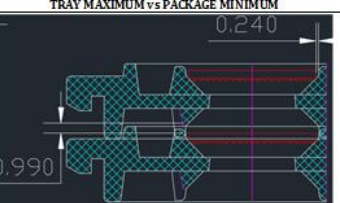
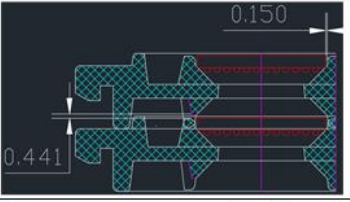
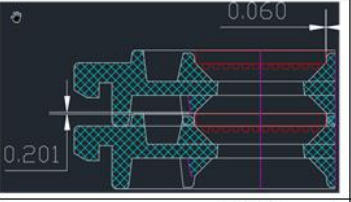
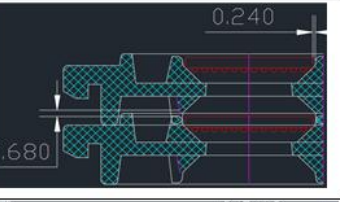


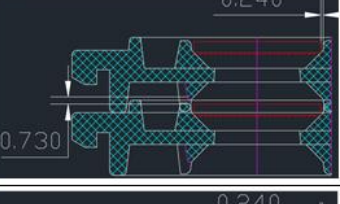
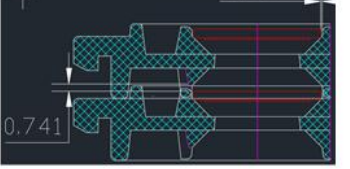
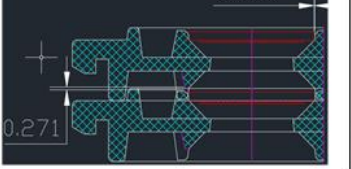
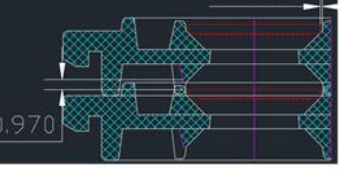


REMARKS:

- ❖ X and Y clearance is less than 0.5mm
- ❖ Rotation angle is less than 10 degrees

Group 3 Device Fit Analysis:

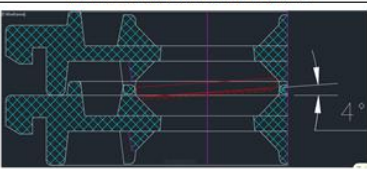
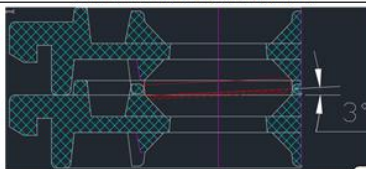
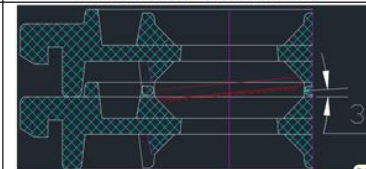
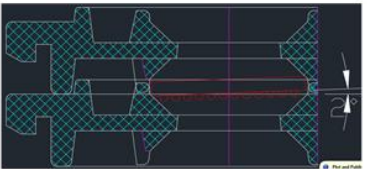
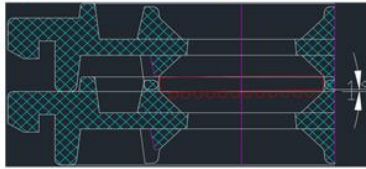
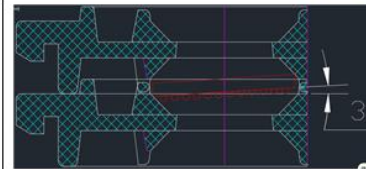
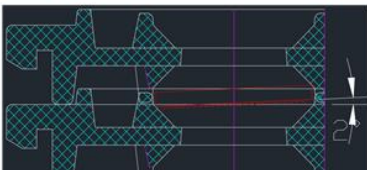
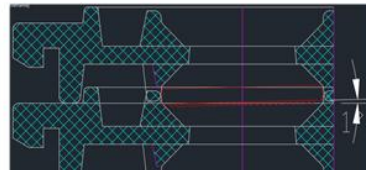
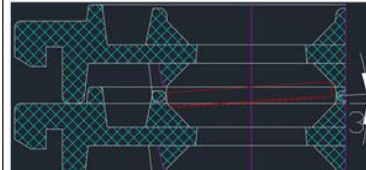
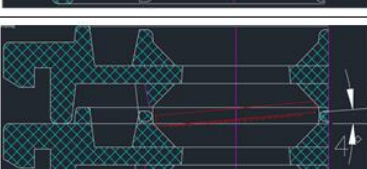
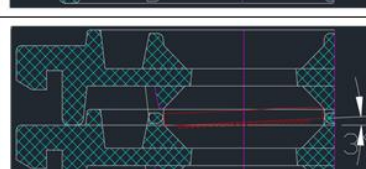
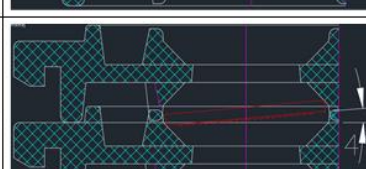
FIT ANALYSIS

| PACKAGE | NOMINAL TRAY vs NOMINAL PACKAGE | TRAY MINIMUM vs PACKAGE MAXIMUM | TRAY MAXIMUM vs PACKAGE MINIMUM |
|---------|--|---|--|
| ZCE/GCE |  |  |  |
| ZWQ |  |  |  |
| ZXK |  |  |  |
| ZAA |  |  |  |

- X and Y clearance is not greater than 5 mm

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FIT ANALYSIS

| PACKAGE | NOMINAL TRAY vs NOMINAL PACKAGE | TRAY MINIMUM vs PACKAGE MAXIMUM | TRAY MAXIMUM vs PACKAGE MINIMUM |
|---------|---|---|---|
| ZCE/GCE |  |  |  |
| ZWQ |  |  |  |
| ZXK |  |  |  |
| ZAA |  |  |  |

- Angle is less than 10degrees

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For questions regarding this notice, e-mails can be sent to the contacts shown below or your local Field Sales Representative.

| Location | E-Mail |
|-----------------|--|
| USA | PCNAmericasContact@list.ti.com |
| Europe | PCNEuropeContact@list.ti.com |
| Asia Pacific | PCNAsiaContact@list.ti.com |
| WW PCN Team | PCN_ww_admin_team@list.ti.com |

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