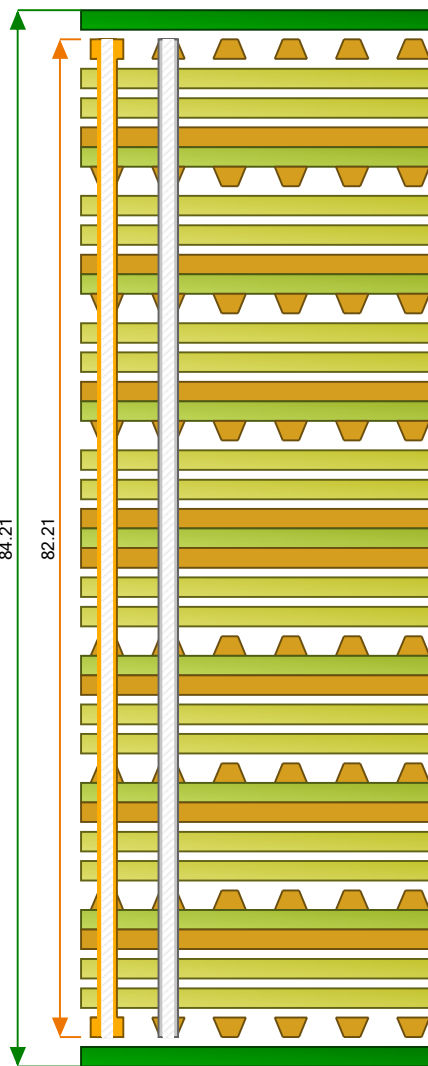



| Layer                          | Stack up   | Description                         | Processed Thickness                 | Isolation Distance (Summed) | Copper Coverage | εr     | Loss Tangent | Impedance ID |                            |                    |
|--------------------------------|--|-------------------------------------|-------------------------------------|-----------------------------|-----------------|--------|--------------|--------------|----------------------------|--------------------|
| 1                              |  | Taiyo PSR 4000 HFX DI-GREEN         | 1.000                               |                             |                 | 3.500  | 0.0270       |              |                            |                    |
|                                |  | Copper Foil 12 microns              | 1.850                               |                             | 100.000         |        |              |              | 1, 2, 3, 4, 5              |                    |
|                                |  | Isola I-TERA MT40 PP 1067 RC69      | 2.148                               | 4.296                       |                 | 3.240  | 0.0024       |              |                            |                    |
| Isola I-TERA MT40 PP 1067 RC69 |  | 2.148                               | -                                   |                             | 3.240           | 0.0024 |              |              |                            |                    |
| 2                              |  |                                     |                                     | 1.260                       |                 | 60.000 |              |              |                            |                    |
|                                |  | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                               | 4.000                       |                 | 3.530  | 0.0032       |              |                            |                    |
|                                |  |                                     | 1.260                               |                             | 50.000          |        |              |              | 6, 7, 8, 9, 10             |                    |
| 3                              |  |                                     | Isola I-TERA MT40 PP 1035 RC67      | 1.703                       | 4.046           |        | 3.280        | 0.0026       |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1067 RC76      | 2.343                               | -                           |                 | 3.080  | 0.0020       |              |                            |                    |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
| 4                              |  |                                     | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                       | 4.000           |        | 3.530        | 0.0032       |                            |                    |
|                                |  |                                     | 1.260                               |                             | 50.000          |        |              |              | 11, 12, 13, 14, 15         |                    |
|                                |  |                                     | Isola I-TERA MT40 PP 1035 RC67      | 1.703                       | 4.046           |        | 3.280        | 0.0026       |                            |                    |
| 5                              |  |                                     | Isola I-TERA MT40 PP 1067 RC76      | 2.343                       | -               |        | 3.080        | 0.0020       |                            |                    |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
|                                |  | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                               | 4.000                       |                 | 3.530  | 0.0032       |              |                            |                    |
| 6                              |  |                                     |                                     | 1.260                       |                 | 50.000 |              |              |                            |                    |
|                                |  |                                     | Isola I-TERA MT40 PP 1035 RC67      | 1.703                       | 4.046           |        | 3.280        | 0.0026       |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1067 RC76      | 2.343                               | -                           |                 | 3.080  | 0.0020       |              |                            |                    |
| 7                              |  |                                     |                                     | 1.260                       |                 | 60.000 |              |              |                            |                    |
|                                |  | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                               | 4.000                       |                 | 3.530  | 0.0032       |              |                            |                    |
|                                |  |                                     | 1.260                               |                             | 50.000          |        |              |              | 16, 17, 18, 19, 20, 21, 22 |                    |
| 8                              |  |                                     | Isola I-TERA MT40 PP 1035 RC67      | 1.703                       | 4.046           |        | 3.280        | 0.0026       |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1067 RC76      | 2.343                               | -                           |                 | 3.080  | 0.0020       |              |                            |                    |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
| 9                              |  |                                     | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                       | 4.000           |        | 3.530        | 0.0032       |                            |                    |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
|                                |  |                                     | Isola I-TERA MT40 PP 1067 RC76      | 2.343                       | 4.046           |        | 3.080        | 0.0020       |                            |                    |
| 10                             |  |                                     | Isola I-TERA MT40 PP 1035 RC67      | 1.703                       | -               |        | 3.280        | 0.0026       |                            |                    |
|                                |  |                                     | 1.260                               |                             | 50.000          |        |              |              | 23, 24, 25, 26, 27         |                    |
|                                |  | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                               | 4.000                       |                 | 3.530  | 0.0032       |              |                            |                    |
| 11                             |  |                                     |                                     | 1.260                       |                 | 60.000 |              |              |                            |                    |
|                                |  |                                     | Isola I-TERA MT40 PP 1067 RC76      | 2.343                       | 4.046           |        | 3.080        | 0.0020       |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1035 RC67      | 1.703                               | -                           |                 | 3.280  | 0.0026       |              |                            |                    |
| 12                             |  |                                     |                                     | 1.260                       |                 | 50.000 |              |              |                            |                    |
|                                |  | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                               | 4.000                       |                 | 3.530  | 0.0032       |              |                            | 28, 29, 30, 31, 32 |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
| 13                             |  |                                     | Isola I-TERA MT40 PP 1067 RC76      | 2.343                       | 4.046           |        | 3.080        | 0.0020       |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1035 RC67      | 1.703                               | -                           |                 | 3.280  | 0.0026       |              |                            |                    |
|                                |  |                                     | 1.260                               |                             | 50.000          |        |              |              | 33, 34, 35, 36, 37         |                    |
| 14                             |  |                                     | Isola I-Tera MT40 4MIL 1/1 (1x3313) | 4.000                       | 4.000           |        | 3.530        | 0.0032       |                            |                    |
|                                |  |                                     | 1.260                               |                             | 60.000          |        |              |              |                            |                    |
|                                |  | Isola I-TERA MT40 PP 1067 RC69      | 2.148                               | 4.296                       |                 | 3.240  | 0.0024       |              |                            |                    |
| 15                             |  | Isola I-TERA MT40 PP 1067 RC69      | 2.148                               | -                           |                 | 3.240  | 0.0024       |              |                            |                    |
|                                |  | Copper Foil 12 microns              | 1.850                               |                             | 100.000         |        |              |              | 38, 39, 40, 41, 42         |                    |
|                                | Taiyo PSR 4000 HFX DI-GREEN  | 1.000                               |                                     |                             | 3.500           | 0.0270 |              |              |                            |                    |

Copper Thickness = 21.338 | Dielectric Thickness = 60.869 | Solder Mask Thickness = 2.000 | Stack Up Thickness = 82.206 | Stack Up Thickness with Soldermask = 84.206


|                              |                       |           |               |                   |        |
|------------------------------|-----------------------|-----------|---------------|-------------------|--------|
| StackName: Master            | Version:              | Revision: | Modification: | Date of Revision: | Editor |
| Date: 16-08-2022             | Associated Documents: |           |               |                   |        |
| Author: -                    |                       |           |               |                   |        |
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| Impedance ID | Impedance Signal Layer | Structure Name                     | Ref. Plane 1 in Layer | Ref. Plane 2 in Layer | Lower Trace Width (W1) | Trace Separation (S1) | Ground Strip Separation (D1) | Calculated Impedance | Target Impedance | Tol (+/- %) |  |
|--------------|------------------------|------------------------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------------|----------------------|------------------|-------------|--|
| 1            | 1                      | Coated Microstrip 1B               | 2                     | 0                     | 12.500                 | 0.000                 | 0.000                        | 39.950               | 40.000           | 10.000      |  |
| 2            | 1                      | Coated Microstrip 1B               | 2                     | 0                     | 8.400                  | 0.000                 | 0.000                        | 49.910               | 50.000           | 10.000      |  |
| 3            | 1                      | Coated Microstrip 1B               | 2                     | 0                     | 16.900                 | 0.000                 | 0.000                        | 33.010               | 33.000           | 10.000      |  |
| 4            | 1                      | Edge Coupled Coated Microstrip 1B  | 2                     | 0                     | 5.000                  | 5.300                 | 0.000                        | 100.010              | 100.000          | 10.000      |  |
| 5            | 1                      | Edge Coupled Coated Microstrip 1B  | 2                     | 0                     | 7.700                  | 5.500                 | 0.000                        | 85.020               | 85.000           | 10.000      |  |
| 6            | 3                      | Offset Stripline 1B2A              | 2                     | 4                     | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 7            | 3                      | Offset Stripline 1B2A              | 2                     | 4                     | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 8            | 3                      | Offset Stripline 1B2A              | 2                     | 4                     | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |
| 9            | 3                      | Edge Coupled Offset Stripline 1B2A | 2                     | 4                     | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 10           | 3                      | Edge Coupled Offset Stripline 1B2A | 2                     | 4                     | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 11           | 5                      | Offset Stripline 1B2A              | 4                     | 6                     | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 12           | 5                      | Offset Stripline 1B2A              | 4                     | 6                     | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 13           | 5                      | Offset Stripline 1B2A              | 4                     | 6                     | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |
| 14           | 5                      | Edge Coupled Offset Stripline 1B2A | 4                     | 6                     | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 15           | 5                      | Edge Coupled Offset Stripline 1B2A | 4                     | 6                     | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 16           | 7                      | Offset Stripline 1B2A              | 6                     | 8                     | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 17           | 7                      | Offset Stripline 1B2A              | 6                     | 8                     | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 18           | 7                      | Offset Stripline 1B2A              | 6                     | 8                     | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |
| 19           | 7                      | Edge Coupled Offset Stripline 1B2A | 6                     | 8                     | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 20           | 7                      | Edge Coupled Offset Stripline 1B2A | 6                     | 8                     | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 21           | 7                      | Offset Stripline 1B2A              | 6                     | 8                     | 8.000                  | 0.000                 | 0.000                        | 32.900               | 33.000           | 10.000      |  |
| 22           | 7                      | Edge Coupled Offset Stripline 1B2A | 6                     | 8                     | 7.300                  | 5.400                 | 0.000                        | 66.040               | 66.000           | 10.000      |  |
| 23           | 10                     | Offset Stripline 1B2A              | 9                     | 11                    | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 24           | 10                     | Offset Stripline 1B2A              | 9                     | 11                    | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 25           | 10                     | Offset Stripline 1B2A              | 9                     | 11                    | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |

|                              |                       |           |               |                   |        |          |   |
|------------------------------|-----------------------|-----------|---------------|-------------------|--------|----------|---|
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| Date: 16-08-2022             | Associated Documents: |           |               |                   |        |          |   |
| Author: -                    |                       |           |               |                   |        |          |   |
| Department: Engg-CAM         |                       |           |               |                   |        |          |   |
| Site: www.hiqelectronics.com |                       |           |               |                   |        |          |   |

| Impedance ID | Impedance Signal Layer | Structure Name                     | Ref. Plane 1 in Layer | Ref. Plane 2 in Layer | Lower Trace Width (W1) | Trace Separation (S1) | Ground Strip Separation (D1) | Calculated Impedance | Target Impedance | Tol (+/- %) |  |
|--------------|------------------------|------------------------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------------|----------------------|------------------|-------------|--|
| 26           | 10                     | Edge Coupled Offset Stripline 1B2A | 9                     | 11                    | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 27           | 10                     | Edge Coupled Offset Stripline 1B2A | 9                     | 11                    | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 28           | 12                     | Offset Stripline 1B2A              | 11                    | 13                    | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 29           | 12                     | Offset Stripline 1B2A              | 11                    | 13                    | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 30           | 12                     | Offset Stripline 1B2A              | 11                    | 13                    | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |
| 31           | 12                     | Edge Coupled Offset Stripline 1B2A | 11                    | 13                    | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 32           | 12                     | Edge Coupled Offset Stripline 1B2A | 11                    | 13                    | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 33           | 14                     | Offset Stripline 1B2A              | 13                    | 15                    | 5.750                  | 0.000                 | 0.000                        | 40.080               | 40.000           | 10.000      |  |
| 34           | 14                     | Offset Stripline 1B2A              | 13                    | 15                    | 3.750                  | 0.000                 | 0.000                        | 49.840               | 50.000           | 10.000      |  |
| 35           | 14                     | Offset Stripline 1B2A              | 13                    | 15                    | 3.200                  | 0.000                 | 0.000                        | 53.490               | 56.000           | 10.000      |  |
| 36           | 14                     | Edge Coupled Offset Stripline 1B2A | 13                    | 15                    | 3.200                  | 5.800                 | 0.000                        | 99.890               | 100.000          | 10.000      |  |
| 37           | 14                     | Edge Coupled Offset Stripline 1B2A | 13                    | 15                    | 5.000                  | 5.000                 | 0.000                        | 80.120               | 80.000           | 10.000      |  |
| 38           | 16                     | Coated Microstrip 1B               | 15                    | 0                     | 12.500                 | 0.000                 | 0.000                        | 39.950               | 40.000           | 10.000      |  |
| 39           | 16                     | Coated Microstrip 1B               | 15                    | 0                     | 8.400                  | 0.000                 | 0.000                        | 49.910               | 50.000           | 10.000      |  |
| 40           | 16                     | Coated Microstrip 1B               | 15                    | 0                     | 16.900                 | 0.000                 | 0.000                        | 33.010               | 33.000           | 10.000      |  |
| 41           | 16                     | Edge Coupled Coated Microstrip 1B  | 15                    | 0                     | 5.000                  | 5.300                 | 0.000                        | 100.010              | 100.000          | 10.000      |  |
| 42           | 16                     | Edge Coupled Coated Microstrip 1B  | 15                    | 0                     | 7.700                  | 5.500                 | 0.000                        | 85.020               | 85.000           | 10.000      |  |

Notes

|                              |                       |           |               |                   |        |          |   |
|------------------------------|-----------------------|-----------|---------------|-------------------|--------|----------|---|
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| Date: 16-08-2022             | Associated Documents: |           |               |                   |        |          |   |
| Author: -                    |                       |           |               |                   |        |          |   |
| Department: Engg-CAM         |                       |           |               |                   |        |          |   |
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