### Application: 2.5GHz Band 30dB Chip Directional Coupler

1. **Type No.**
   HMD2713A-30M2600

2. **Dimension (Unit: mm)**
   - Top view: 
     - Dimension: 6.35+/−0.25
     - Terminal Dimensions: 
       - a: 1.02+/−0.10
       - b: 0.51+/−0.20
       - c: 3.30+/−0.20
       - d: 0.51+/−0.20
       - e: 1.02+/−0.10
       - f: 1.02+/−0.10
       - g: 0.51+/−0.20
       - h: 2.08+/−0.20
       - i: 0.51+/−0.20
       - j: 1.02+/−0.10
   - Side view: 
     - Dimension: 5.08+/−0.25
     - Terminal Dimensions: 
       - a: 1.02+/−0.10
       - b: 0.51+/−0.20
       - c: 3.30+/−0.20
       - d: 0.51+/−0.20
       - e: 1.02+/−0.10
       - f: 1.02+/−0.10
       - g: 0.51+/−0.20
       - h: 2.08+/−0.20
       - i: 0.51+/−0.20
       - j: 1.02+/−0.10
   - Bottom view: 
     - Dimension: 1.58+/−0.31

3. **Electrical characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Band1</th>
<th>Band2</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>Specification</td>
<td>2300-2900</td>
<td>2500-2700</td>
</tr>
<tr>
<td>Nominal impedance</td>
<td>Specification</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Mean Coupling</td>
<td>Specification</td>
<td>30.0+/−1.0</td>
<td>30.0+/−0.8</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>30.54</td>
<td>30.44</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>Specification</td>
<td>max 0.10</td>
<td>max 0.05</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>0.048</td>
<td>0.041</td>
</tr>
<tr>
<td>VSWR</td>
<td>Specification</td>
<td>max 1:1.15</td>
<td>max 1:1.12</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>1.04</td>
<td>1.04</td>
</tr>
<tr>
<td>Return Loss</td>
<td>Specification</td>
<td>min 23.13</td>
<td>min 24.94</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>34.22</td>
<td>34.88</td>
</tr>
<tr>
<td>Directivity</td>
<td>Specification</td>
<td>min 20</td>
<td>min 22</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>26.95</td>
<td>29.03</td>
</tr>
<tr>
<td>Frequency Sensitivity</td>
<td>Specification</td>
<td>max +/-0.25</td>
<td>max +/-0.10</td>
</tr>
<tr>
<td></td>
<td>Typical</td>
<td>0.14</td>
<td>0.04</td>
</tr>
</tbody>
</table>

4. **Note**

   - **Operating Temperature Range**: -55 to +95 deg.C
   - **Storage Temperature Range**: -40 to +85 deg.C (goods alone)
   - **Input Power**: max 200 W Avg/CW
   - **Minimum Ordering Quantity**: 1,000 pcs (per reel, per bag)

---

SOSHIN ELECTRIC CO., LTD

Approved by: Y. Mizutani
Confirmed by: A. Mizuma
Raised by: K. Hamada
5. Representative characteristics

- **Frequency vs. Insertion Loss**

- **Frequency vs. Coupling**

- **Frequency vs. Directivity**

- **Frequency vs. Return Loss**
6. Recommended Land Pattern (Unit:mm)

Land Pattern

- (*1) 50 ohm impedance line
- (*2) Ground Plane

Resist Pattern

- (*1) Solder Resist

Dimensions:
- Width: 8.35 mm
- Height: 7.08 mm
- Length: 3.20 mm
- Width: 1.93 mm
- Height: 0.61 mm

SOSHIN ELECTRIC CO., LTD
7. Tape packaging method

7.1 Tape packaging must conform to the following specifications. Refer to IEC-286-3 for items which are not included in them.

1. Tape must be wound clockwise with the feeding hole coming to the right hand side when the tape end is pulled out towards an operator.

2. Top cover tape must not cover feeding holes of carrier tape and/or show out of carrier tape.

3. A blank section carrying no chips of a length of 160mm min. on ending section and 100mm min. on leading section must be provided.

4. A leading section of 400mm min. must be provided on top cover tape.

5. To end tape winding, the leading section of top cover tape must be stuck on a side of a reel with adhesive tape.

6. Removing force of top cover tape in the unwinding with an angle of 170 degrees between the removed side of a reel and carrier tape must be 0.1 to 1.0 N.

7. A sticker carrying Soshin product No., quantity, lot No. is to be placed on the specified side of reels.
(8) Product orientation must be consistent. Products must not be positioned out of the mounting location.

(9) Tape-packaged quantity
The quantity is 1,000 pieces per single tape-package as a rule.

7.2 Dimensions of the carrier tape (Unit: mm)

7.3 Carrier tape reel dimensions (Unit: mm)
8. Recommended use conditions
   Reflow soldering conditions

   (1) High temperature reflow conditions (Products may be put through reflow oven 2 times maximum.)
   T1: 230deg C, T2: 180deg C, T3: 150deg C
   a: Preheating for 60 - 120 seconds,
   b: Heating for 30 - 50 seconds,
   c: Peak temperature 260±5deg C, 5 - 10 seconds
   d: Temperature ramp-up slope – 10deg C, max./1 sec.
   e: Temperature ramp-down slope – 8deg C, max./1 sec.

*Solder build-up

   Formation of a solder fillet measuring 0.3 mm or up to a half of the product thickness (t) at edges external electrode must be ascertained. Solder build-up which is shorter or greater than this dimension may cause detrimental effects on the mechanical strength and/or variation in electrical performance.

Example) When a 0.3 mm thick solder mask is used, fillets will be about 0.95 mm