1. Standard Land Pattern Dimensions

- Reflow and Flow
  - DLW21S/H
  - DLW31SN
  - DLW43SH110/220/510
  - DLW43SH101

- Reflow Soldering
  - DLP0QS
  - DLP0NS
  - DLP11S/DLM11S
  - DLP11R/11TDLP0NSDLP0QS
  - DLP1ND
  - DLP2AD
  - DLM11G
  - DLW21S
  - DLW21H
  - DLW31SN
  - DLW43S
  - DLW44S
  - DLW5A
  - DLW5B

<table>
<thead>
<tr>
<th>Series</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLW21S/H</td>
<td>0.8</td>
<td>2.6</td>
<td>0.4</td>
<td>1.2</td>
</tr>
<tr>
<td>DLW31SN</td>
<td>1.6</td>
<td>3.7</td>
<td>0.4</td>
<td>1.6</td>
</tr>
<tr>
<td>DLW43SH110/220/510</td>
<td>3.0</td>
<td>5.9</td>
<td>1.6</td>
<td>3.4</td>
</tr>
<tr>
<td>DLW43SH101</td>
<td>3.2</td>
<td>5.9</td>
<td>1.6</td>
<td>3.4</td>
</tr>
</tbody>
</table>

1: If the pattern is made wider than 1.2mm (DLW21) / 1.6mm (DLW31S), it may result in components turning around, because melting speed is different. In the worst case, short circuit between lines may occur.

2: If the pattern is made with less than specified dimensions, in the worst case, short circuit between lines may occur due to spread of soldering paste or mounting accuracy.

3: If the pattern is made wider than 0.8mm (DLW21) / 1.6mm (DLW31SN), the bending strength will be reduced. Do not use gild pattern; excess soldering heat may dissolve metal of a copper wire.
PCB Warping

PCB should be designed so that products are not subjected to the mechanical stress caused by warping the board.

Products should be located in the sideways direction (Length: a-b) to the mechanical stress.

Poor example  →  Good example
2. Solder Paste Printing and Adhesive Application

When reflow soldering the chip common mode choke coils, the printing must be conducted in accordance with the following cream solder printing conditions. If too much solder is applied, the chip will be prone to damage by mechanical and thermal stress from the PCB and may crack. Standard land dimensions should be used for resist and copper foil patterns.

When flow soldering the chip common mode choke coils, apply the adhesive in accordance with the following conditions. If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability. In contrast, if insufficient adhesive is applied, or if the adhesive is not sufficiently hardened, then the chip may become detached during flow soldering process.

Guideline of solder paste thickness:
- 80-100μm: DLP0QS
- 100-150μm: DLW21S/21H/31S, DLP0NS/11S/11R/11T/1ND/2AD/DLM11S/11G
- 150μm: DLW43S
- 150-200μm: DLP31D/31S, DLW44S/5A/5B

*Solderability is subject to reflow conditions and thermal conductivity. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

Series | Solder Paste Printing | Adhesive Application
--- | --- | ---
DLP | | |
DLP0QS | | |
DLP0NS | | |
DLM11S/DLP11S | | |
DLP11R/T | | |
DLP31S | | |
DLM11G | | |
DLW21S/21H/31S | | |
DLP0QS/0NS/11S/11R/11T/31S/DLM11S/11G | | |
DLP11D/2AD/31D | | |
DLW43S | | |
DLW44S/5A/5B | | |
DLW5AT_MQ2 | | |

For DLP31S/DLP31D/ DLW5AT_MQ2, apply 0.3mg of bonding agent at each chip.

Series | a | b | c | d
--- | --- | --- | --- | ---
DLP0QS | 0.3 | 0.2 | 0.23 | 0.48
DLP0NS | 0.3 | 0.3 | 0.3 | 0.5
DLM11S/DLP11S | 0.7 | 0.55 | 0.3 | 0.55
DLP11R/T | 0.5 | 0.55 | 0.3 | 0.55
DLP31S | 1.0 | 0.6 | 0.7 | 2.1
DLM11G | 0.5 | 0.5 | 0.4 | 0.7

Series | a | b | c | d
--- | --- | --- | --- | ---
DLW21S/H | 0.8 | 2.6 | 0.5 | 1.2
DLW31S | 1.6 | 3.7 | 0.4 | 1.6

Series | a | b | c | d
--- | --- | --- | --- | ---
DLP11D | 0.3 | 0.3 | 0.2 | 0.4
DLP2AD | 0.55 | 0.4 | 0.25 | 0.5
DLP31D | 1.0 | 0.8 | 0.4 | 0.8

Series | a | b | c
--- | --- | ---
DLW43S | 3.0 (110/220/510) | 5.9 | 1.6 | 3.4

Series | a | b | c | d | e | f
--- | --- | --- | --- | --- | --- | ---
DLW44S | 0.8 | 2.5 | 5.6 | 0.9 | 1.9 | 3.9
DLW5A/5B | 0.9 | 2.9 | 5.5 | 1.3 | 3.3 | 4.7
3. Standard Soldering Conditions

(1) Soldering Methods
Use flow and reflow soldering methods only.
Use standard soldering conditions when soldering chip common mode choke coils.
In cases where several different parts are soldered, each having different soldering conditions, use those conditions requiring the least heat and minimum time.

Solder: Use Sn-3.0Ag-0.5Cu solder. Use of Sn-Zn based solder will deteriorate performance of products.
If using DLP/DLM series with Sn-Zn based solder, please contact Murata in advance.

Flux:
- Use Rosin-based flux.
  In case of DLW21/31 series, use Rosin-based flux with converting chlorine content of 0.06 to 0.1wt%.
  In case of using RA type solder, products should be cleaned completely with no residual flux.
- Do not use strong acidic flux (with chlorine content exceeding 0.20wt%)
- Do not use water-soluble flux.

For additional mounting methods, please contact Murata.

(2) Soldering Profile

● Flow Soldering Profile
(Sn-3.0Ag-0.5Cu Solder)

<table>
<thead>
<tr>
<th>Series</th>
<th>Pre-heating</th>
<th>Standard Profile</th>
<th>Limit Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temp. (T1)</td>
<td>Time. (t1)</td>
<td>Heating</td>
</tr>
<tr>
<td>DLWSAT_MQ2</td>
<td>150°C</td>
<td>60s min.</td>
<td>250°C</td>
</tr>
<tr>
<td>DLP31D/31S</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

● Reflow Soldering Profile
(Sn-3.0Ag-0.5Cu Solder)

<table>
<thead>
<tr>
<th>Series</th>
<th>Heating</th>
<th>Peak Temperature (T2)</th>
<th>Cycle of Reflow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temp. (T1)</td>
<td>Time. (t1)</td>
<td></td>
</tr>
<tr>
<td>DLW21/31</td>
<td>220°C min.</td>
<td>30 to 60s</td>
<td>245±3°C</td>
</tr>
<tr>
<td>DLW43S</td>
<td>220°C min.</td>
<td>30 to 60s</td>
<td>245±3°C</td>
</tr>
<tr>
<td>DLW44S/5A/5B</td>
<td>220°C min.</td>
<td>30 to 60s</td>
<td>250±3°C</td>
</tr>
</tbody>
</table>
(3) Reworking with Solder Iron
The following conditions must be strictly followed when using a soldering iron.
Pre-heating: 150°C 60s min.
Soldering iron power output / Tip diameter:
30W max. / ø3mm max.
Temperature of soldering iron tip / Soldering time / Times:
350°C max. / 3-4s / 2 times
** DLPOQS, DLPONS, DLPI1S, DLPI1T, DLPI1D,
  DLPI2AD: 380°C max. / 3-4s / 2 times
  DLW43S: 350°C max. / 3s / 2 times
Do not allow the tip of the soldering iron to directly contact the chip.
For additional methods of reworking with a soldering iron, please contact Murata engineering.

4. Cleaning
Following conditions should be observed when cleaning chip EMI filter.
(1) Cleaning Temperature: 60°C max. (40°C max. for alcohol type cleaner)
(2) Ultrasonic
  Output: 20W/liter max.
  Duration: 5 minutes max.
  Frequency: 28 to 40kHz
(3) Cleaning agent
  The following list of cleaning agents have been tested on the individual components. Evaluation of final assembly should be completed prior to production.
  Do not clean DLW (Except for DLW21H) series.
  Before cleaning, please contact Murata engineering.
    (a) Alcohol cleaning agent
        Isopropyl alcohol (IPA)
    (b) Aqueous cleaning agent
        Pine Alpha ST-100S
    (4) Ensure that flux residue is completely removed.
      Component should be thoroughly dried after aqueous agent has been removed with deionized water.