

## ● Part Numbering

### Chip EMIFIL® Capacitor Type/Capacitor Array Type

(Part Number) 

NF	M	3D	CC	102	R	1H	3	L
①	②	③	④	⑤	⑥	⑦	⑧	⑨

#### ① Product ID

Product ID	
<b>NF</b>	Chip EMIFIL®

#### ② Structure

Code	Structure
<b>M</b>	Capacitor Type
<b>A</b>	Capacitor Array Type

#### ③ Dimensions (L×W)

Code	Dimensions (L×W)	EIA
<b>18</b>	1.6×0.8mm	0603
<b>21</b>	2.0×1.25mm	0805
<b>3D</b>	3.2×1.25mm	1205
<b>31</b>	3.2×1.6mm	1206
<b>41</b>	4.5×1.6mm	1806
<b>55</b>	5.7×5.0mm	2220

#### ④ Features

Code	Features
<b>CC</b>	Capacitor Type for Signal Lines
<b>PC</b>	Capacitor Type for Large Current
<b>PS</b>	High Loss Type for Large Current

#### ⑤ Capacitance

Expressed by three figures. The unit is in pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures.

#### ⑨ Packaging

Code	Packaging	Series
<b>L</b>	Plastic Taping (ø180mm Reel)	<b>NFM3D/NFM41/NFM55</b>
<b>B</b>	Bulk	All series
<b>D</b>	Paper Taping (ø180mm Reel)	<b>NFM18/NFM21/NFA□□CC</b>

#### ⑥ Characteristics

Code	Capacitance Change (Temperature Characteristics)
<b>B</b>	±10%
<b>F</b>	+30/-80%
<b>R</b>	±15%
<b>U</b>	-750 ±120ppm/°C
<b>S</b>	+350 to -1000ppm/°C

#### ⑦ Rated Voltage

Code	Rated Voltage
<b>0J</b>	6.3V
<b>1A</b>	10V
<b>1C</b>	16V
<b>1E</b>	25V
<b>1H</b>	50V
<b>2A</b>	100V

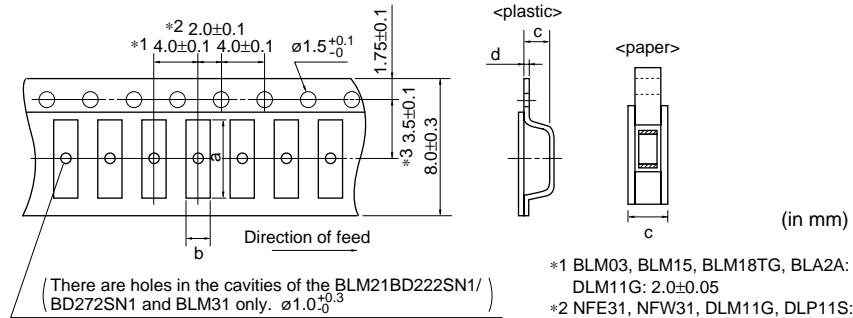
#### ⑧ Electrode/Others (NFM Series)

Code	Electrode	Series
<b>3</b>	Sn Plating	<b>NFM (Except NFM55)</b>
<b>4</b>	Solder Coating	<b>NFM55</b>

#### ⑧ Number of Circuits (NFA□□CC Series)

Code	Number of Circuits
<b>4</b>	4 Circuits

## ■ Minimum Quantity and Dimensions of 8mm Width Paper / Plastic Tape



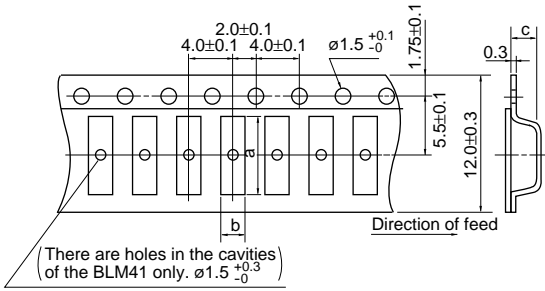
Part Number	Cavity Size (in mm)				Minimum Qty. (pcs.)				
					ø180mm reel		ø330mm reel		Bulk
	a	b	c	d	Paper Tape	Plastic Tape	Paper Tape	Plastic Tape	
BLM03	0.70	0.40	0.55 max.	-	15000	-	-	-	1000
BLM15	1.15	0.65	0.8 max.	-	10000	-	50000	-	1000
BLM18	1.85	1.05	1.1 max.	-	4000	-	10000	-	1000
BLM18E	1.85	1.05	0.85 max.	-	4000	-	10000	-	1000
BLM18TG	1.85	1.05	0.90 max.	-	10000	-	-	-	1000
BLM21	2.25	1.45	1.1 max.	-	4000	-	10000	-	1000
BLM31	3.5	1.9	1.3	0.2	-	3000	-	10000	1000
BLM21BD222SN1/272SN1	2.25	1.45	1.3	0.2	-	3000	-	10000	1000
BLA2A	2.2	1.2	0.8 max.	-	10000	-	-	-	1000
BLA31	3.4	1.8	1.1 max.	-	4000	-	10000	-	1000
NFM18C/NFM18PC (Except 105R)/NFM18PS	1.85	1.05	0.9 max.	-	4000	-	-	-	500
NFM18PC105R			1.1 max.	-	4000	-	-	-	500
NFL18SP	1.85	1.05	0.9 max.	-	4000	-	-	-	1000
NFL18ST			1.1 max.	-					
NFL21SP	2.3	1.55	1.1 max.	-	4000	-	-	-	500
NFM21	2.3	1.55	1.1 max.	-	4000	-	-	-	500
NFM3DC/3DP	3.4	1.4	0.85	0.2	-	4000	-	-	500
NFA21SL_45	2.30	1.55	0.7	0.25	-	4000	-	-	1000
NFA21SL_48	2.25	1.45	1.05	0.25	-	4000	-	-	1000
NFA31G/31C	3.5	2.0	1.1 max.	-	4000	-	-	-	100
NFE31P	3.6	1.8	1.85	0.2	-	2000	-	8000	500
NFR21G	2.3	1.55	0.7	0.25	-	4000	-	-	500
NFW31S	3.6	1.9	2.0	0.2	-	2000	-	7500	-
DLM11G	1.45	1.2	0.8 max.	-	10000	-	-	-	1000
DLM2HG	2.75	2.25	1.3	0.25	-	3000	-	-	1000
DLP11S	1.4	1.2	0.98	0.25	-	3000	-	-	500
DLP2AD	2.2	1.2	0.98	0.25	-	3000	-	-	500
DLP31D/31S	3.5	1.9	1.3	0.25	-	3000	-	-	500
DLW21S	2.25	1.45	1.4	0.3	-	2000	-	-	500
DLW21H	2.3	1.55	1.1	0.25	-	3000	-	-	500
DLW31S	3.6	2.0	2.1	0.3	-	2000	-	-	500

• Please contact us for BLM15/18 in bulk case.

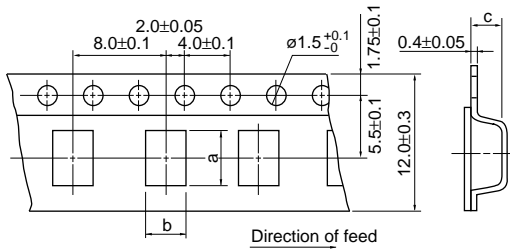
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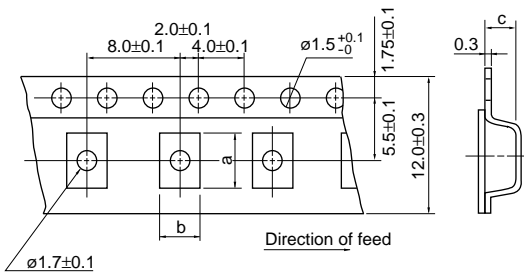
Minimum Quantity and Dimensions of 12mm Width Plastic Tape



Part Number	Cavity Size			Minimum Qty. (pcs.)		
	a	b	c	ø180mm reel	ø330mm reel	Bulk
<b>BLM41</b>	4.8	1.9	1.75	2500	8000	1000
<b>NFM41</b>	4.8	1.8	1.1	4000	-	500
<b>NFE61</b>	7.2	1.9	1.75	2500	8000	500



Part Number	Cavity Size			Minimum Qty. (pcs.)		
	a	b	c	ø180mm reel	ø330mm reel	Bulk
<b>DLW5AH</b>	5.4	4.1	4.4	400	1500	100
<b>DLW5BS</b>	5.5	5.4	4.7	400	1500	100
<b>DLW5BT</b>	5.5	5.5	2.7	700	2500	100



Part Number	Cavity Size			Minimum Qty. (pcs.)	
	a	b	c	ø180mm reel	ø330mm reel
<b>NFM55P</b>	6.0	5.3	2.5	500	-

(in mm)

1. Standard Land Pattern Dimensions

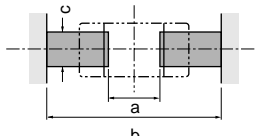
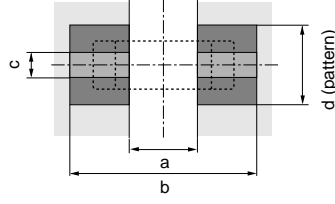
NF□ series suppress noise by conducting the high-frequency noise element to ground. Therefore, to obtain maximum performance from these filters, the ground pattern should be made as large as possible during the PCB design stage. As shown in the right, one side of the PCB is used for chip mounting, and the other is used for grounding.

Small diameter feedthrough holes are then used to connect the grounds on each side of the PCB. This reduces the high-frequency impedance of the grounding and maximizes the filter's performance. Please contact us if using a thinner land pad than 18μm for NFM55P.



**BLM03**  
**BLM15**  
 (Except BLM 15A\_AN series)  
**BLM18**  
**BLM21**  
**BLM31**  
**BLM41**

●Reflow and Flow

Type	Soldering	a	b	c
*BLM03	Reflow	0.2-0.3	0.6-0.9	0.3
*BLM15	Reflow	0.4	1.2-1.4	0.5
BLM18 (except 18PG type)	Flow (except 18G type)	0.7	2.2-2.6	0.7
	Reflow		1.8-2.0	
BLM21 (except 21PG type)	Flow/ Reflow	1.2	3.0-4.0	1.0

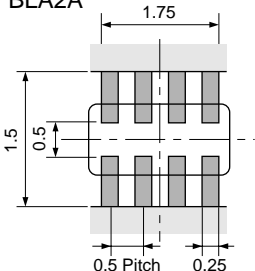
\*BLM03/15/18G is specially adapted for reflow soldering.

Type	Rated Current (A)	Soldering	a	b	c	Land pad thickness and dimension d		
						18μm	35μm	70μm
BLM15PG	1	Reflow	0.4	1.2-1.4	0.5	0.5	0.5	0.5
	0.5-1.5					0.7	0.7	0.7
	2					1.2	0.7	0.7
BLM18PG	3	Flow/ Reflow	0.7	2.2-2.6 1.8-2.0	0.7	2.4	1.2	0.7
	1.5					1.0	1.0	1.0
	2					1.2	1.0	1.0
BLM21PG	3	Flow/ Reflow	1.2	3.0-4.0	1.0	2.4	1.2	1.0
	6					6.4	3.3	1.65
	1.5/2					1.2	1.2	1.2
BLM31PG	3	Flow/ Reflow	2.0	4.2-5.2	1.2	2.4	1.2	1.2
	6					6.4	3.3	1.65
	1-2					1.2	1.2	1.2
BLM41PG	3	Flow/ Reflow	3.0	5.5-6.5	1.2	2.4	1.2	1.2
	6					6.4	3.3	1.65

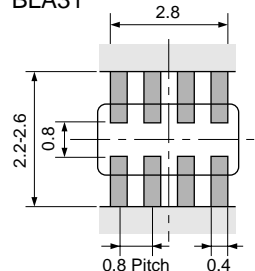
●Do not apply narrower pattern than listed above to BLM□□P. Narrow pattern can cause excessive heat or open circuit.

**BLA2A**  
**BLA31**


●Reflow soldering



●Reflow and Flow



• If there are high amounts of self-heating on pattern, the contact points of PCB and part may become damaged.

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Land Pattern + Solder Resist  
 Land Pattern  
 Solder Resist  
 (in mm)

<b>NFE61P</b> <b>NFE61H</b>	<p>● Reflow Soldering Chip mounting side</p>	<p>● Flow Soldering (Except NFE61HT332) Chip mounting side</p>															
<b>DLM11G</b> <b>DLM2HG</b> <b>DLP31S</b> <b>DLP31D</b> <b>DLP11S</b> <b>DLP2AD</b> <b>DLW21S</b> <b>DLW21H</b> <b>DLW31S</b> <b>DLW5AH</b> <b>DLW5BS</b> <b>DLW5BT</b>	<p>● Reflow and Flow</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>DLM2HG</p> </div> <div style="text-align: center;"> <p>DLP31S</p> </div> <div style="text-align: center;"> <p>DLP31D</p> </div> </div>																
<p>● Reflow Soldering</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>DLP11S</p> </div> <div style="text-align: center;"> <p>DLP2AD</p> </div> <div style="text-align: center;"> <p>DLM11G</p> </div> <div style="text-align: center;"> <p>DLW21/DLW31S</p> </div> </div> <div style="margin-top: 20px;"> <p>DLW5AH/5BS/5BT</p> </div>																	
<table border="1" style="width: 100%; border-collapse: collapse; margin-top: 20px;"> <thead> <tr> <th style="text-align: center;">Series</th> <th style="text-align: center;">a</th> <th style="text-align: center;">b</th> <th style="text-align: center;">c</th> <th style="text-align: center;">d</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><b>DLW21S/H</b></td> <td style="text-align: center;">0.8</td> <td style="text-align: center;">2.6</td> <td style="text-align: center;">0.4</td> <td style="text-align: center;">1.2</td> </tr> <tr> <td style="text-align: center;"><b>DLW31S</b></td> <td style="text-align: center;">1.6</td> <td style="text-align: center;">3.7</td> <td style="text-align: center;">0.4</td> <td style="text-align: center;">1.6</td> </tr> </tbody> </table> <div style="margin-top: 10px;"> <p>* 1: If the pattern is made with 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.</p> <p>* 2: If the pattern is made with less than 0.4mm, in the worst case, short circuit between lines may occur due to spread of soldering paste or mount placing accuracy.</p> <p>* 3: If the pattern is made with wider than 0.8mm (DLW21) / 1.6mm (DLW31S), the bending strength will be reduced. Do not use gild pattern; excess soldering heat may dissolve metal of a copper wire.</p> </div>			Series	a	b	c	d	<b>DLW21S/H</b>	0.8	2.6	0.4	1.2	<b>DLW31S</b>	1.6	3.7	0.4	1.6
Series	a	b	c	d													
<b>DLW21S/H</b>	0.8	2.6	0.4	1.2													
<b>DLW31S</b>	1.6	3.7	0.4	1.6													

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## 2. Solder Paste Printing and Adhesive Application

When reflow soldering the chip EMI suppression filter, 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. In contrast, if too little solder is applied, there is the potential that the termination strength will be insufficient, creating the potential for detachment.

Standard land dimensions should be used for resist and

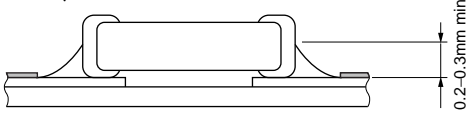
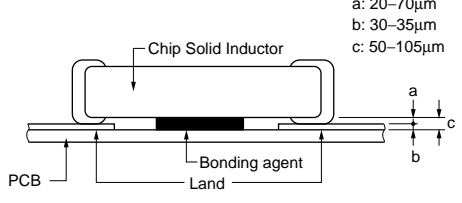
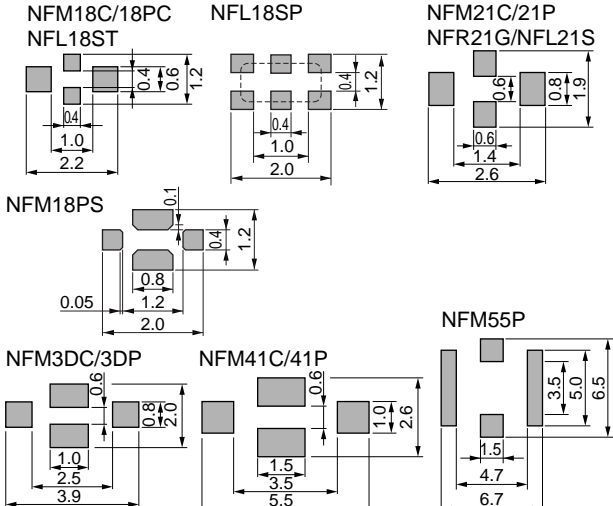
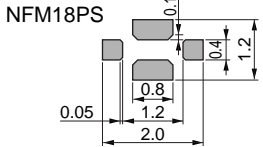
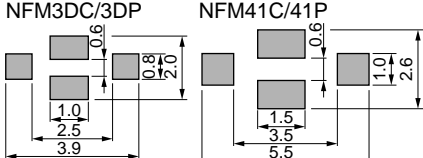
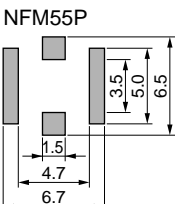
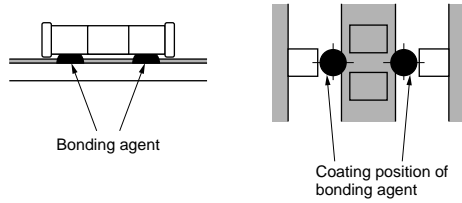
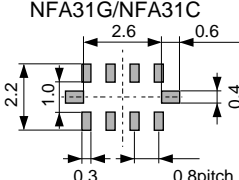
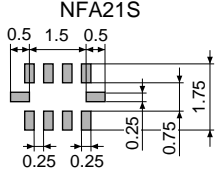
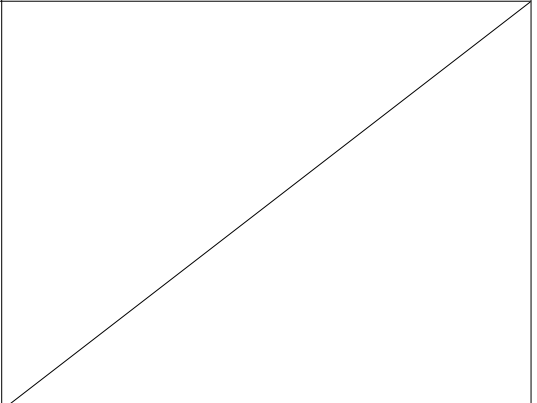
copper foil patterns.


When flow soldering the EMI suppression filter, apply the adhesive in accordance with the following conditions.

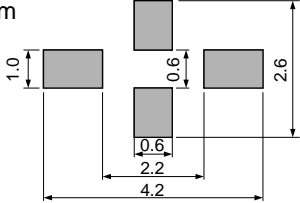
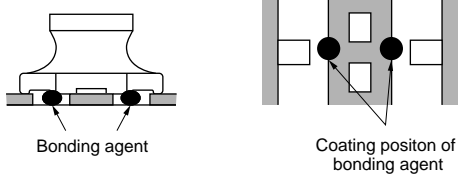
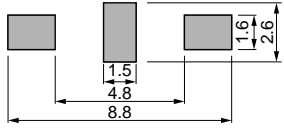
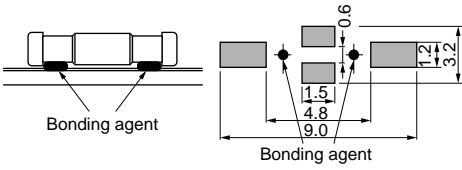
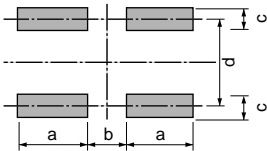
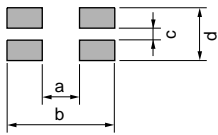
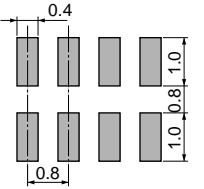
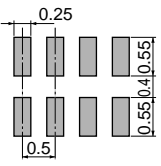
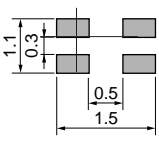
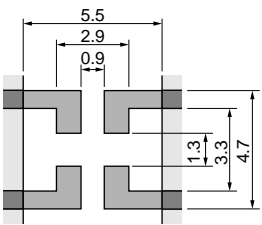
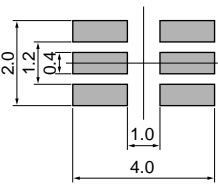
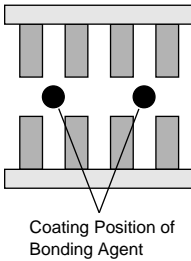
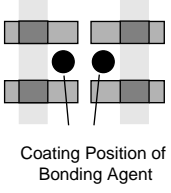
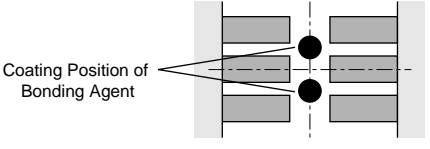
If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability.

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.

(in mm)

Series	Solder Paste Printing	Adhesive Application
<p><b>BLM</b> (Except BLM 15A_AN series) <b>BLA</b></p>	<ul style="list-style-type: none"> <li>●Ensure that solder is applied smoothly to a minimum height of 0.2mm to 0.3mm at the end surface of the part.</li> <li>●Coat with solder paste to the following thickness: 100-150<math>\mu</math>m: BLM03 100-200<math>\mu</math>m: BLM15/18/21/31/41, BLA</li> </ul> 	<p>Coating amount is illustrated in the following diagram.</p> 
<p><b>NFM</b> <b>NFR</b> <b>NFL</b></p>	<ul style="list-style-type: none"> <li>●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.</li> <li>●Coat with solder paste to the following thickness: 100-150<math>\mu</math>m: NFM18/21/3D,NFR, NFL 150-200<math>\mu</math>m: NFM55P 100-200<math>\mu</math>m: NFM41</li> </ul> <p>NFM18C/18PC NFL18SP NFM21C/21P NFR21G/NFL21S</p>  <p>NFM18PS</p>  <p>NFM3DC/3DP NFM41C/41P</p>  <p>NFM55P</p> 	<p>Apply 0.1mg for NFM41C/41P and 0.06mg for NFM3DC/3DP of bonding agent at each chip. Do not cover electrodes.</p> 
<p><b>NFA</b></p>	<ul style="list-style-type: none"> <li>●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.</li> <li>●Coat with solder paste to the following thickness: 100-200<math>\mu</math>m: NFA31G/NFA31C 100-150<math>\mu</math>m: NFA21S</li> </ul> <p>NFA31G/NFA31C</p>  <p>NFA21S</p> 	

Continued on the following page. 

Series	Solder Paste Printing	Adhesive Application																														
<b>NFW31S</b> <b>NFE31P</b>	<ul style="list-style-type: none"> <li>● Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.</li> <li>● Coat with solder paste to the following thickness: 150-200µm</li> </ul> 	<p>NFW31S Series Apply 0.2mg of bonding agent at each chip.</p> 																														
<b>NFE61P</b> <b>NFE61H</b>	<ul style="list-style-type: none"> <li>● Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.</li> <li>● Coat with solder paste to the following thickness: 150-200µm</li> </ul> 	<p>Apply 1.0mg of bonding agent at each chip.</p> 																														
<b>DLP</b> <b>DLW</b> <b>DLM</b>	<ul style="list-style-type: none"> <li>● Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.</li> <li>● Coat with solder paste to the following thickness:                      100-150µm: DLW21S/21H/31S, DLP11S, DLP2AD                      150-200µm: DLP31D/31S, DLM2HG,                      DLW5AH/5BS/5BT</li> </ul> <p>*Solderability is subjected to reflow condition 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.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>DLP11S/31S</p>  <table border="1" data-bbox="343 1505 619 1608"> <thead> <tr> <th>Series</th> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td><b>DLP11S</b></td> <td>0.7</td> <td>0.55</td> <td>0.3</td> <td>0.55</td> </tr> <tr> <td><b>DLP31S</b></td> <td>1.0</td> <td>0.6</td> <td>0.7</td> <td>2.1</td> </tr> </tbody> </table> </div> <div style="text-align: center;"> <p>DLW21S/21H/31S</p>  <table border="1" data-bbox="641 1505 917 1608"> <thead> <tr> <th>Series</th> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td><b>DLW21S/H</b></td> <td>0.8</td> <td>2.6</td> <td>0.5</td> <td>1.2</td> </tr> <tr> <td><b>DLW31S</b></td> <td>1.6</td> <td>3.7</td> <td>0.4</td> <td>1.6</td> </tr> </tbody> </table> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>DLP31D</p>  </div> <div style="text-align: center;"> <p>DLP2AD</p>  </div> <div style="text-align: center;"> <p>DLM11G</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>DLW5AH/5BS/5BT</p>  </div> <div style="text-align: center;"> <p>DLM2HG</p>  </div> </div>	Series	a	b	c	d	<b>DLP11S</b>	0.7	0.55	0.3	0.55	<b>DLP31S</b>	1.0	0.6	0.7	2.1	Series	a	b	c	d	<b>DLW21S/H</b>	0.8	2.6	0.5	1.2	<b>DLW31S</b>	1.6	3.7	0.4	1.6	<p>DLP31S/DLM2HG Apply 0.3mg of bonding agent at each chip.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p>DLP31D</p>  </div> <div style="text-align: center;"> <p>DLP31S</p>  </div> </div> <div style="text-align: center; margin-top: 10px;"> <p>DLM2HG</p>  </div>
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### 3. Standard Soldering Conditions

#### (1) Soldering Methods

Use flow and reflow soldering methods only.  
 Use standard soldering conditions when soldering chip EMI suppression filters chip varistor.  
 In cases where several different parts are soldered, each having different soldering conditions, use those conditions requiring the least heat and minimum time.

Solder: H60A H63A solder (JIS Z 3238)

In case of lead-free solder, use Sn-3.0Ag-0.5Cu solder

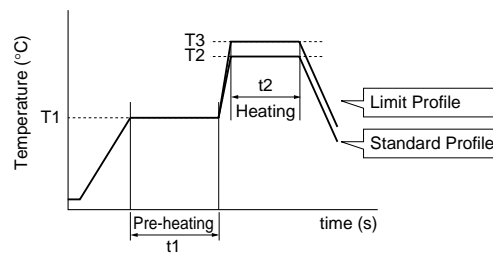
Flux:

- Use Rosin-based flux, (with converting chlorine content 0.06 to 0.1wt% for DLW21. when using RA type solder, clean products sufficiently to avoid 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  
 (Eutectic solder, Sn-3.0Ag-0.5Cu solder)



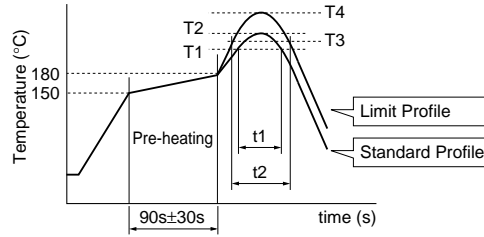
Series	Pre-heating		Standard Profile			Limit Profile		
	Temp. (T1)	Time. (t1)	Heating		Cycle of flow	Heating		Cycle of flow
			Temp. (T2)	Time. (t2)		Temp. (T3)	Time. (t2)	
<b>BLM</b> (Except <b>BLM03/15/18G</b> ) <b>BLA31</b> <b>NFM3DC/3DP</b> <b>NFM41C/41P</b> <b>NFE61H*/61P</b> <b>DLM2HG</b> <b>DLP31D/31S</b>	150°C	60s min.	250°C	4 to 6s	2 times	265±3°C	5s max.	2 times
<b>NFW31S</b>	150°C	60s min.	250°C	4 to 6s	2 times	265±3°C	5s max.	1 times

\*Except NFE61HT332

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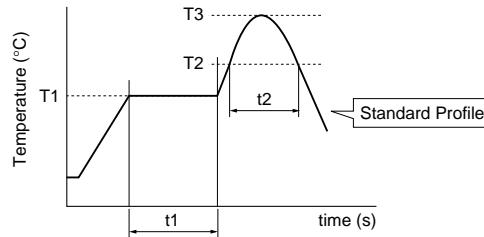
● Reflow Soldering profile

① Soldering profile for Lead-free solder (Sn-3Ag-0.5Cu)



Series	Standard Profile				Limit Profile			
	Heating		Peak temperature (T2)	Cycle of reflow	Heating		Peak temperature (T4)	Cycle of reflow
	Temp. (T1)	Time. (t1)			Temp. (T3)	Time. (t2)		
BLM, BLA NFA, NFE NFL, NFM NFR, DLM DLP DLW21/31	220°C min.	30 to 60s	245±3°C	2 times	230°C min.	60s max.	260°C/10s	2 times
DLW5A/5B	220°C min.	30 to 60s	250±3°C	2 times	230°C min.	60s max.	260°C/10s	2 times
NFW31S	220°C min.	30 to 60s	245±3°C	2 times	230°C min.	60s max.	260°C/10s	1 times

② Soldering profile for Eutectic solder (Limit profile: refer to ①)



Series	Pre-heating		Standard Profile			
	Temp. (T1)	Time. (t1)	Heating		Peak temperature (T3)	Cycle of reflow
			Temp. (T2)	Time. (t2)		
BLM, BLA NFA, NFE NFL, NFM NFR, NFW DLM, DLP DLW	150°C	60s min.	183°C min.	60s max.	230°C	2 times

(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: 30W max.

Temperature of soldering iron tip / Soldering time: 280°C max./10s max. or 300°C max./3s max.\*

\*NFE31PT152Z1E9: 280°C max./10s max. only

BLM : 350°C max./3s max.

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.

Continued from the preceding page.

#### 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 DLW21S/31S/5AH/5BS series.

In case of cleaning, please contact Murata engineering.

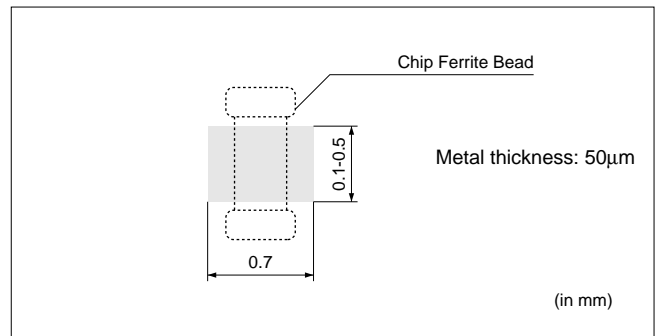
- a) Alcohol cleaning agent  
Isopropyl alcohol (IPA)
  - b) Aqueous cleaning agent  
Pine Alpha ST-100S
- (4) Ensure that flux residue is completely removed.  
Component should be thoroughly dried after aqueous agent has been removed with deionized water.
  - (5) Some products may become slightly whitened.  
However, product performance or usage is not affected.  
For additional cleaning methods, please contact Murata engineering.

#### 5. Mounting of BLM15A\_AN Series

BLM15A\_AN is series for wire bonding mounting.

##### 1. Die bonding mounting

###### (1) Dimension of standard metal mask



###### (2) Die bonding agent

- Use adhesive for die bonding for which the curing temperature is 200°C or less.

###### (3) Notice

- Use a flat surface of substrate for bonding mounting.  
Slant mounting of product may affect the wire bonding.
- Adhesive for die bonding may affect the mounting reliability in wire bonding.  
Make sure of the mounting reliability with the adhesive to be used in advance.