

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.

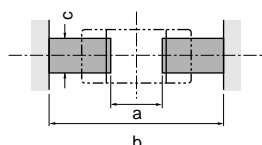
Small diameter feedthrough holes are then used to connect the grounds on each side of the PCB. This reduces the high-frequency impedance of the grounding and maximizes the filter's performance. Please contact us if using a thinner land pad than 18μm for NFM55P.



BLM03
BLM15
 (Except BLM
 15A_AN series)
BLM18
BLM21
BLM31
BLM41

●Reflow and Flow

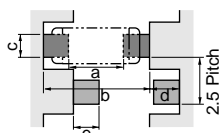
BLM Series (Except BLM□□P series)



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
BLM31 (except 31PG type)		2.0	4.2-5.2	1.2
BLM41 (except 41P□ type)		3.0	5.5-6.5	

*BLM03/15 is specially adapted for reflow soldering.

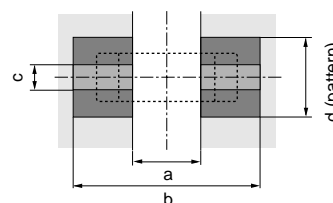
Flow Mounting in High Density for BLM31/41



Type	a	b	c	d	e
BLM31	2.0	4.2-5.2	1.2	1.3	1.35
BLM41	3.0	5.5-6.5	1.2	1.8	1.5

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

BLM□□P

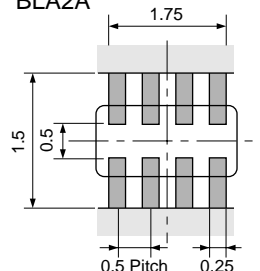


Type	Rated Current (A)	Soldering	a	b	c	Land pad thickness and dimension d		
						18μm	35μm	70μm
BLM15PG	1	Reflow	0.4	1.2-1.4	0.5	0.5	0.5	0.5
BLM18PG	0.5-1.5	Flow/ Reflow	0.7	Flow 2.2-2.6 Reflow 1.8-2.0	0.7	0.7	0.7	0.7
	2					1.2	0.7	0.7
	3					2.4	1.2	0.7
BLM21PG	1.5		1.2	3.0-4.0	1.0	1.0	1.0	1.0
	2					1.2	1.0	1.0
	3					2.4	1.2	1.0
	6					6.4	3.3	1.65
BLM31PG	1.5/2		2.0	4.2-5.2	1.2	1.2	1.2	1.2
	3					2.4	1.2	1.2
	6					6.4	3.3	1.65
BLM41P□	1-2		3.0	5.5-6.5		1.2	1.2	1.2
	3					2.4	1.2	1.2
	6					6.4	3.3	1.65

BLA2A
BLA31

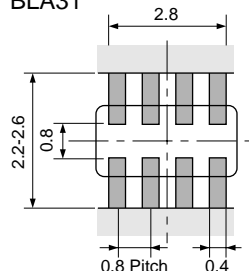
●Reflow soldering

BLA2A




●Reflow and Flow


BLA31



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

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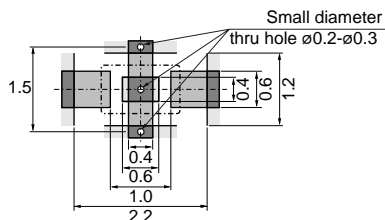
 Land Pattern
 + Solder Resist
 Land Pattern
 Solder Resist

(in mm)

NFM18
NFL18
NFM55

Reflow Soldering

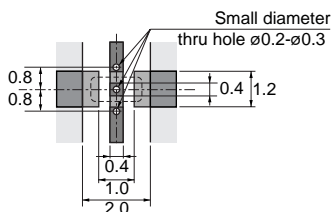
NFM18C/NFM18P/NFL18ST



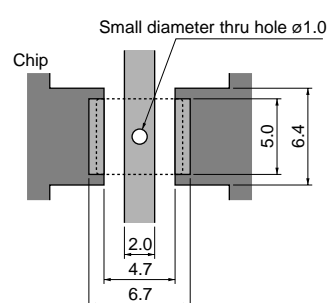
The chip EMI filter suppress noise by conducting the high-frequency noise to ground. Therefore, to get enough noise reduction, feed through holes which is connected to ground-plane should be arranged according to the figure to reinforce the ground-pattern.

- NF□18, NF□21, NFM55 are specially adapted for reflow soldering.

NFL18SP



NFM55P

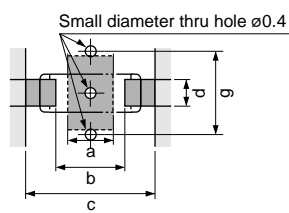


Please contact us if using thinner land pad than 18 μ m.

NFM21
NFM3D
NFM41
NFR21G
NFL21S

● Reflow Soldering

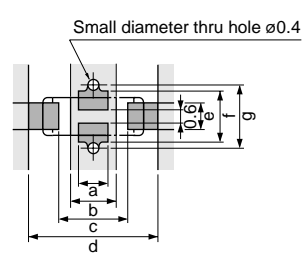
Chip mounting side



Part Number	Size (mm)				
	a	b	c	d	g
NFM21C/NFM21P NFR21G/NFL21S	0.6	1.4	2.6	0.8	2.3
NFM3DC NFM3DP	1.4	2.5	4.4	1.0	2.4
NFM41C NFM41P	2.0	3.5	6.0	1.2	3.0

● Flow Soldering

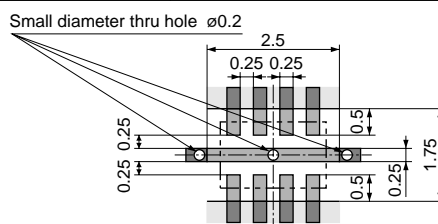
Chip mounting side



Part Number	Size (mm)						
	a	b	c	d	e	f	g
NFM3DC NFM3DP	1.0	1.4	2.5	4.4	1.0	2.0	2.4
NFM41C NFM41P	1.5	2.0	3.5	6.0	1.2	2.6	3.0

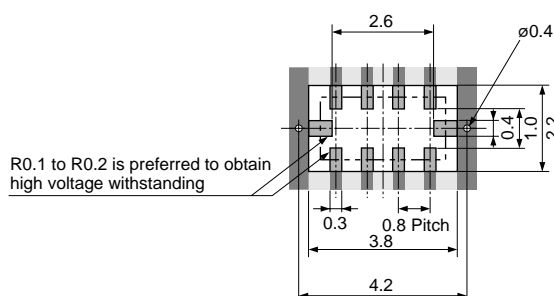
NFA21S

Reflow Soldering
Chip mounting side



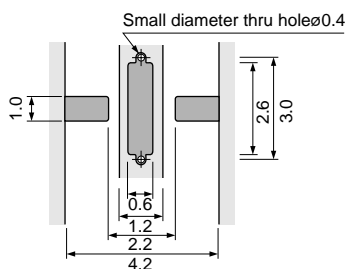
NFA31G
NFA31C
NFW31S
NFE31P

● Reflow Soldering NFA31G/31C



- Reflow and Flow NFW31S
- Reflow Soldering NFE31P

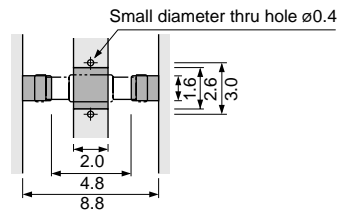
Chip mounting side



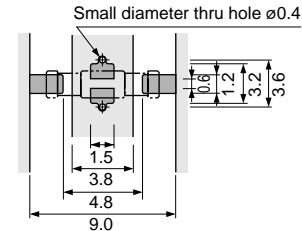
Land Pattern + Solder Resist
Land Pattern
Solder Resist (in mm)

NFE61P
NFE61H

● Reflow Soldering
Chip mounting side

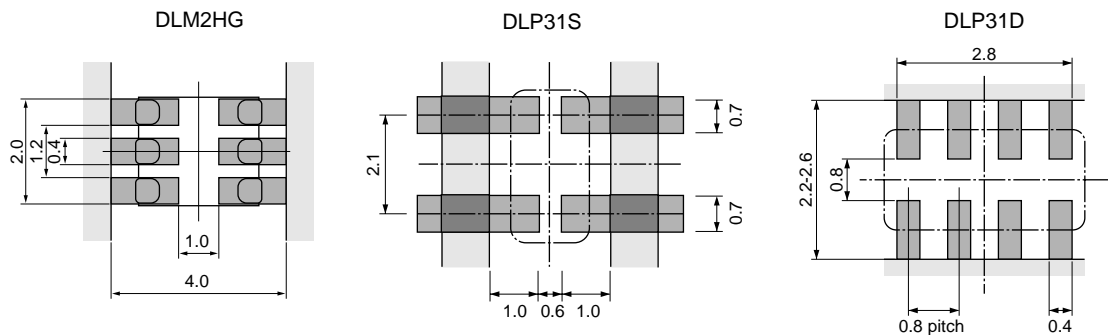


● Flow Soldering (Except NFE61H3321)
Chip mounting side

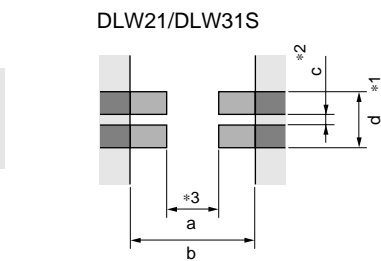
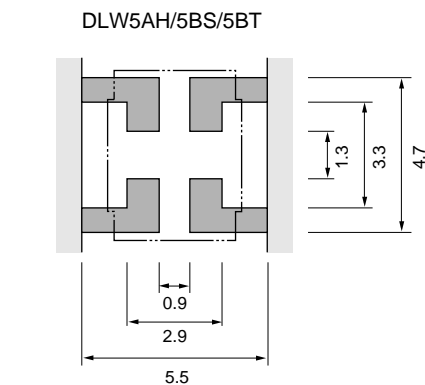
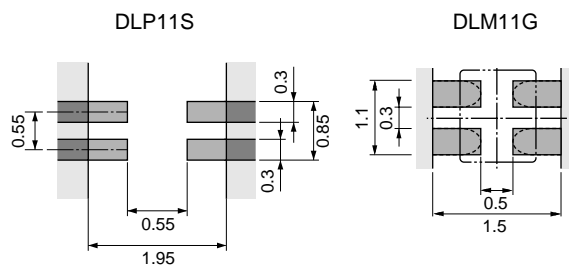


DLM11G
DLM2HG
DLP31S
DLP31D
DLP11S
DLW21S
DLW21H
DLW31S
DLW5AH
DLW5BS
DLW5BT

● Reflow and Flow



● Reflow Soldering



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

- * 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.
- * 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.
- * 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.

Continued from the preceding page.

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

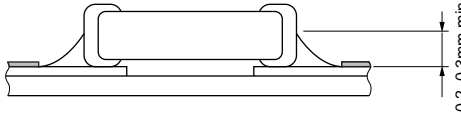
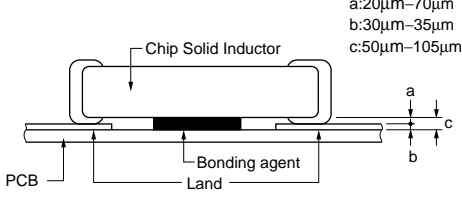
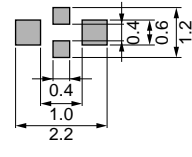
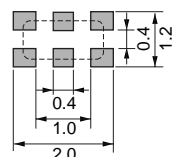
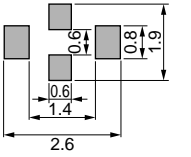
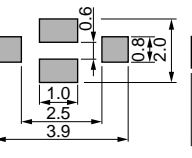
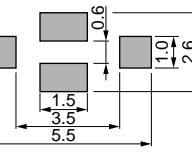
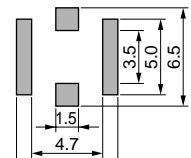
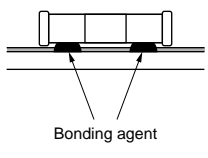
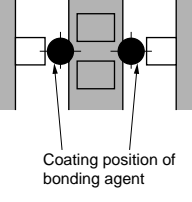
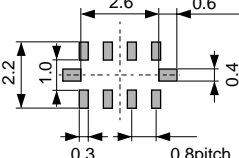
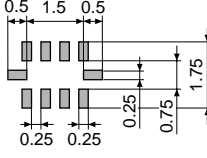
copper foil patterns.


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

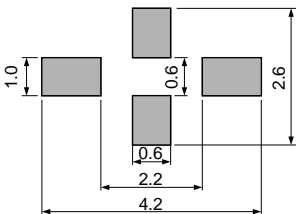
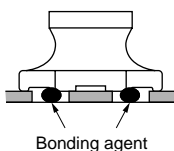
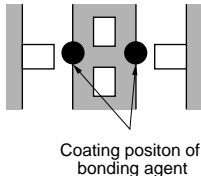
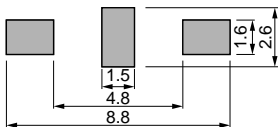
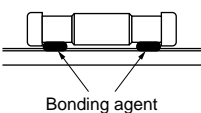
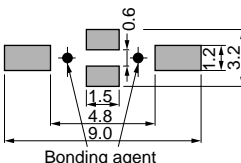
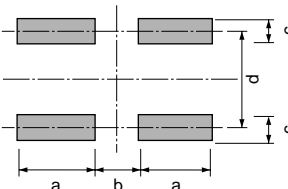
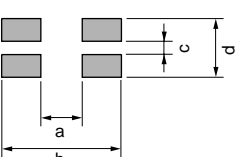
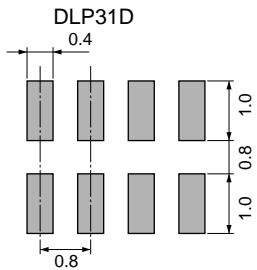
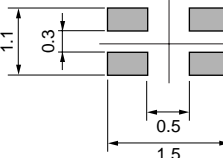
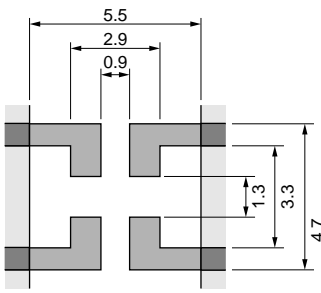
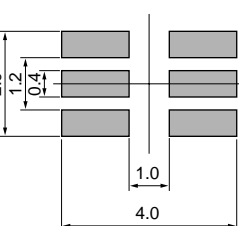
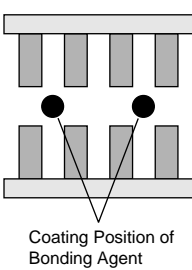
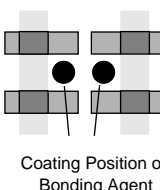
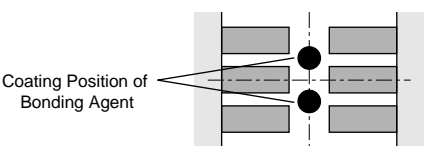
If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability.

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
BLM (Except BLM 15A_AN series) BLA	<ul style="list-style-type: none"> ● Ensure that solder is applied smoothly to a minimum height of 0.2mm to 0.3mm at the end surface of the part. ● Coat the solder paste a thickness: 100-150μm: BLM03 100-200μm: BLM15/18/21/31/41, BLA 	<p>Coating amount is illustrated in the following diagram.</p> 
NFM NFR NFL	<ul style="list-style-type: none"> ● Use H60A solder for pattern printing. ● Coat the solder paste a thickness: 100-150μm: NFM18/21/3D, NFR, NFL 150-200μm: NFM55P 100-200μm: NFM41 <div style="display: flex; justify-content: space-around;"> <div> <p>NFM18C/18P NFL18ST</p>  </div> <div> <p>NFL18SP</p>  </div> <div> <p>NFM21C/21P NFR21G/NFL21S</p>  </div> </div> <div style="display: flex; justify-content: space-around;"> <div> <p>NFM3DC/3DP</p>  </div> <div> <p>NFM41C/41P</p>  </div> <div> <p>NFM55P</p>  </div> </div>	<p>Apply 0.1mg for NFM41C/41P and 0.06mg for NFM3DC/3DP of bonding agent at each chip. Do not cover electrodes.</p> <div style="display: flex; justify-content: space-around;">   </div>
NFA	<ul style="list-style-type: none"> ● Use H60A solder for pattern printing. ● Coat the solder paste a thickness: 100-200μm: NFA31G/NFA31C 100-150μm: NFA21S <div style="display: flex; justify-content: space-around;"> <div> <p>NFA31G/NFA31C</p>  </div> <div> <p>NFA21S</p>  </div> </div>	

Continued on the following page. 

Series	Solder Paste Printing	Adhesive Application																														
NFW31S NFE31P	<ul style="list-style-type: none">●Use H60A solder for pattern printing.●Coat the solder paste a thickness: 150-200μm 	NFW31S Series Apply 0.2mg of bonding agent at each chip.  Bonding agent  Coating position of bonding agent																														
NFE61P NFE61H	<ul style="list-style-type: none">●Use H60A solder for pattern printing.●Coat the solder paste a thickness: 150-200μm 	Apply 1.0mg of bonding agent at each chip.  Bonding agent  Bonding agent																														
DLP DLW DLM	<ul style="list-style-type: none">●Use H60A solder for pattern printing.●Coat the solder paste a thickness: 100-150μm: DLW21S/21H/31S/DLP11S 150-200μm: DLP31D/31S, DLM2HG, DLW5AH/5BS <div><div><p>DLP11S/31S</p><table><thead><tr><th>Series</th><th>a</th><th>b</th><th>c</th><th>d</th></tr></thead><tbody><tr><td>DLP11S</td><td>0.7</td><td>0.55</td><td>0.3</td><td>0.55</td></tr><tr><td>DLP31S</td><td>1.0</td><td>0.6</td><td>0.7</td><td>2.1</td></tr></tbody></table></div><div><p>DLW21S/DLW21H/DLW31S</p><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>0.5</td><td>1.2</td></tr><tr><td>DLW31S</td><td>1.6</td><td>3.7</td><td>0.4</td><td>1.6</td></tr></tbody></table></div></div> <div><div><p>DLP31D</p></div><div><p>DLM11G</p></div></div> <div><div><p>DLW5AH/5BS</p></div><div><p>DLM2HG</p></div></div>	Series	a	b	c	d	DLP11S	0.7	0.55	0.3	0.55	DLP31S	1.0	0.6	0.7	2.1	Series	a	b	c	d	DLW21S/H	0.8	2.6	0.5	1.2	DLW31S	1.6	3.7	0.4	1.6	DLP31S/DLM2HG Apply 0.3mg of bonding agent at each chip. <div><div><p>DLP31D</p> Coating Position of Bonding Agent</div><div><p>DLP31S</p> Coating Position of Bonding Agent</div></div> <div><p>DLM2HG</p> Coating Position of Bonding Agent</div>
Series	a	b	c	d																												
DLP11S	0.7	0.55	0.3	0.55																												
DLP31S	1.0	0.6	0.7	2.1																												
Series	a	b	c	d																												
DLW21S/H	0.8	2.6	0.5	1.2																												
DLW31S	1.6	3.7	0.4	1.6																												

Continued from the preceding page.

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.

(2) Soldering Temperature and Time

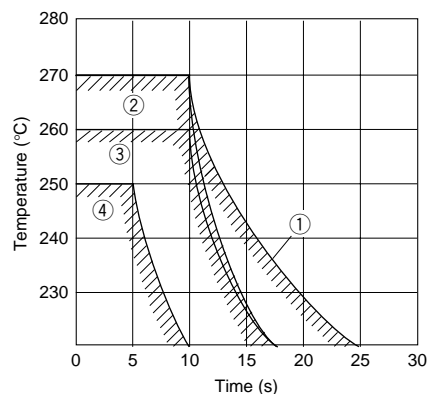
To prevent external electrode solder leaching and performance deterioration, solder within the temperature and time combinations illustrated by the slanted lines in the following graphs. If soldering is repeated, please note that the allowed time is the accumulated time.

Solder : H60A H63A solder (JIS Z 3238)

Flux :

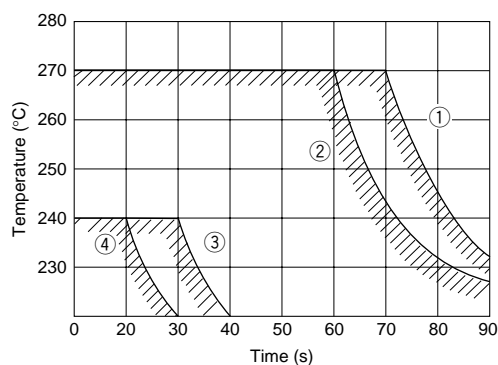
- Use Rosin-based flux (when using RA type solder, clean products sufficiently to avoid residual flux.
- Do not use strong acidic flux (with chlorine content exceeding 0.20wt%)
- Do not use water-soluble flux.

● Allowable Flow Soldering Temperature and Time



①	NFE61P/H (Except NFE61HT332)
②	BLM (Except BLM03/15/18G), BLA31
③	DLM2HG, DLP31D/S
④	NFM3DC/P, NFM41C/P, NFW31S

● Allowable Reflow Soldering Temperature and Time



①	NFE31P/NFE61P/H
②	BLM/BLA (Except BLM15A_AN Series)
③	DLM2HG, DLP31D/S, DLP11S, DLM11G
④	NFM, NFL, NFA, NFR, HFW31S, DLW, NFM55P

Continued on the following page.

(3) Soldering Conditions

(4) Reworking with Solder Iron

The following conditions must be strictly followed when using a soldering iron.

Pre-heating : 150°C 60 s 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/VFM : 280°C max./10 s max. only

BLM : 350°C max./3 s max.

Do not allow the tip of the soldering iron to directly contact the chip.

For additional methods of reworking with to 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 : 28kHz 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.

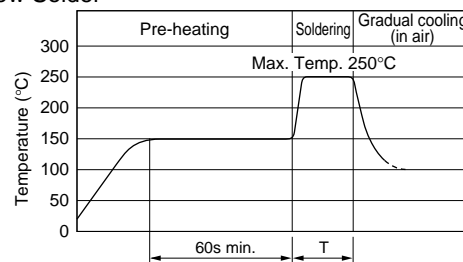
Do not clean DLW21S/31S/5AH/5BS series.

In case of cleaning, please contact Murata engineering.

a) Alcohol cleaning agent

Isopropyl alcohol (IPA)

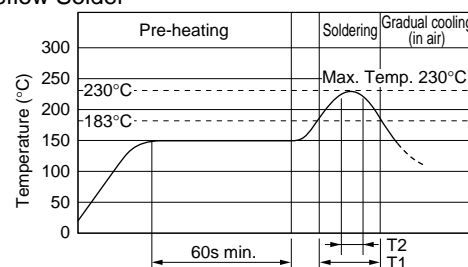
●Flow Solder



Series	Pre-heating (150°C)	Soldering Time(T)	Soldering Temp.(C)
BLM (Except BLM03/15/18G), BLA31	60s min.	10s max.	250
NFM3DC/P , NFM41C/P , NFW31S , NFE61P/H* , DLM2HG , DLP31D/31S		5s max.	

*Except NFE61HT332

●Reflow Solder



Series	Pre-heating (150°C)	Soldering Time	
		T1 (183°C)	T2 (230°C)
NFE31/61	60s min.	60s max.	250°C, 20s max.
BLM , BLA (Except BLM15A_AN Series)			20s max.
NFM , NFL , NFR , NFW , NFA , DLM/P/W			10s max.

b) Aqueous cleaning agent

Surface active agent (Clean Thru 750H)

Hydrocarbon (Cold Cleaner 375)

High grade alcohol (Pine Alpha ST-100S)


Alkaline saponifier (Aqua Cleaner 210SEI-cleaner should be diluted within 15% using deionized water.)

(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.

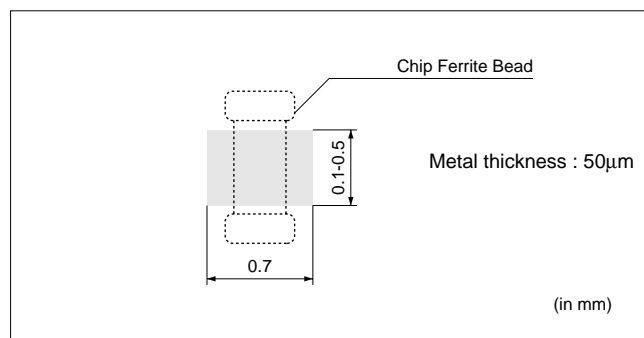
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5. Mounting of BLM15A_AN Series

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 which the curing temperature is 200°C or less.

(3) Notice

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