

1. Standard Land Pattern Dimensions

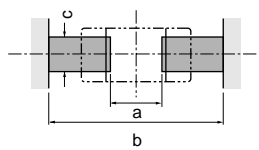
NF□ series suppress noise by conducting the high-frequency noise element to ground. Therefore, to obtain maximum performance from these filters, the ground pattern should be made as large as possible during the PCB design stage. As shown in the right, one side of the PCB is used for chip mounting, and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

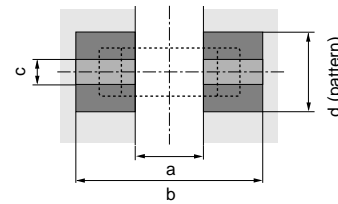
●Reflow and Flow



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.

BLM□□P



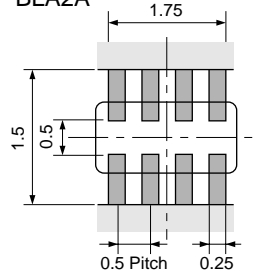
Type	Rated Current (A)	Soldering	a	b	c	Land pad thickness and dimension d		
						18μm	35μm	70μm
BLM15PG	1	Reflow	0.4	1.2-1.4	0.5	0.5	0.5	0.5
BLM18PG	0.5-1.5	Flow/ Reflow	0.7	Flow 2.2-2.6 Reflow 1.8-2.0	0.7	0.7	0.7	0.7
	2					1.2	0.7	0.7
	3					2.4	1.2	0.7
BLM21PG	1.5		1.2	3.0-4.0	1.0	1.0	1.0	1.0
	2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

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

BLA2A
BLA31

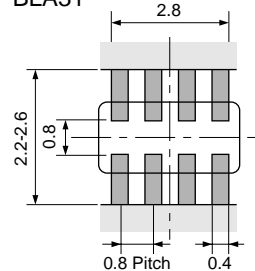
●Reflow soldering

BLA2A




●Reflow and Flow

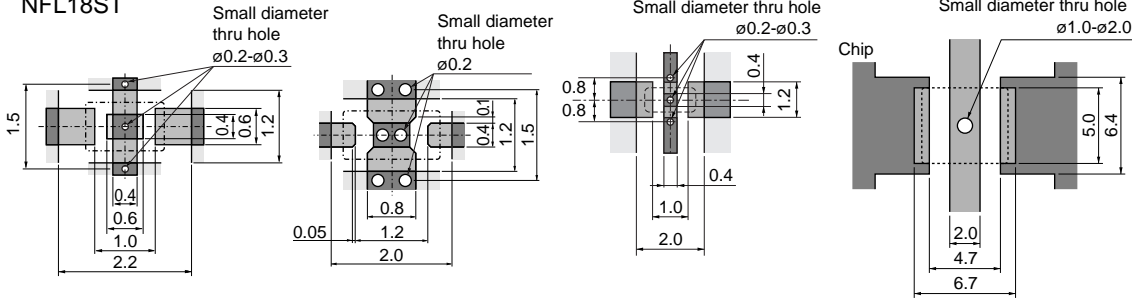
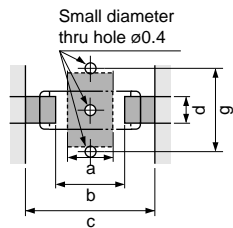
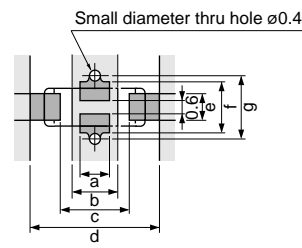
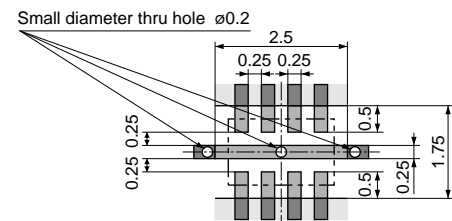
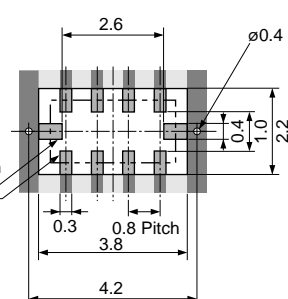
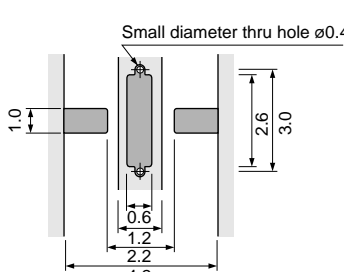
BLA31



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

Continued on the following page. 

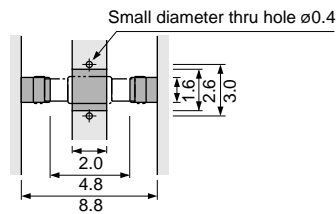
Land Pattern + Solder Resist
Land Pattern
Solder Resist (in mm)

<div>NFM18</div> <div>NFL18</div> <div>NFM55</div>	<div>Reflow Soldering</div> <div>NFM18C/NFM18PC/ NFL18ST</div> <div>NFL18PS</div> <div>NFL18SP</div> <div>NFM55P</div> <div></div> <div>The chip EMI filter suppresses noise by conducting the high-frequency noise to ground. Therefore, to get enough noise reduction, feed through holes which are connected to ground-plane should be arranged according to the figure to reinforce the ground-pattern.</div> <div>• NFM18, NFM21, NFM55 are specially adapted for reflow soldering.</div> <div>Please contact us if using thinner land pad than 18μm.</div>																																																												
<div>NFM21</div> <div>NFM3D</div> <div>NFM41</div> <div>NFR21G</div> <div>NFL21S</div>	<div>● Reflow Soldering</div> <div>Chip mounting side</div> <div></div> <table><tr><th rowspan="2">Part Number</th><th colspan="5">Size (mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>g</th></tr><tr><td>NFM21C/NFM21P NFR21G/NFL21S</td><td>0.6</td><td>1.4</td><td>2.6</td><td>0.8</td><td>2.3</td></tr><tr><td>NFM3DC NFM3DP</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.0</td><td>2.4</td></tr><tr><td>NFM41C NFM41P</td><td>2.0</td><td>3.5</td><td>6.0</td><td>1.2</td><td>3.0</td></tr></table> <div>● Flow Soldering</div> <div>Chip mounting side</div> <div></div> <table><tr><th rowspan="2">Part Number</th><th colspan="7">Size (mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th><th>g</th></tr><tr><td>NFM3DC NFM3DP</td><td>1.0</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.0</td><td>2.0</td><td>2.4</td></tr><tr><td>NFM41C NFM41P</td><td>1.5</td><td>2.0</td><td>3.5</td><td>6.0</td><td>1.2</td><td>2.6</td><td>3.0</td></tr></table>	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	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
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<div>NFA21S</div>	<div>Reflow Soldering</div> <div>Chip mounting side</div> <div></div>																																																												
<div>NFA31G</div> <div>NFA31C</div> <div>NFW31S</div> <div>NFE31P</div>	<div>● Reflow Soldering NFA31G/31C</div> <div></div> <div>R0.1 to R0.2 is preferred to obtain high voltage withstanding</div> <div>● Reflow and Flow NFW31S</div> <div>● Reflow Soldering NFE31P</div> <div>Chip mounting side</div> <div></div>																																																												

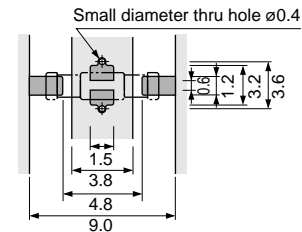
Land Pattern + Solder Resist
Land Pattern
Solder Resist (in mm)

NFE61P
NFE61H

● Reflow Soldering
Chip mounting side

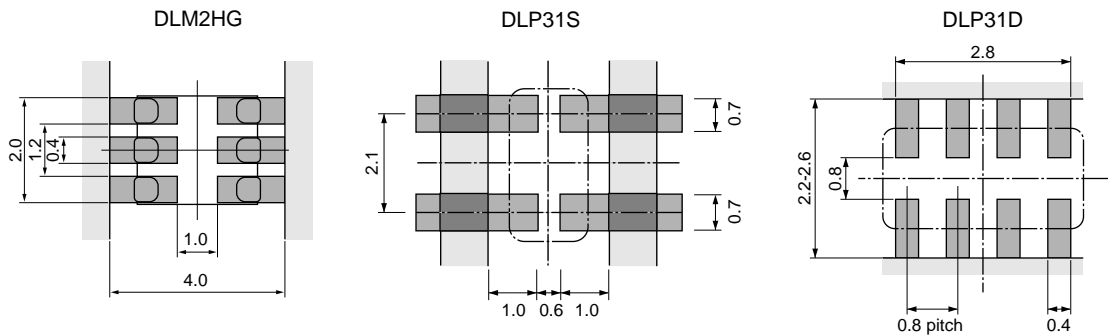


● Flow Soldering (Except NFE61HT332)
Chip mounting side

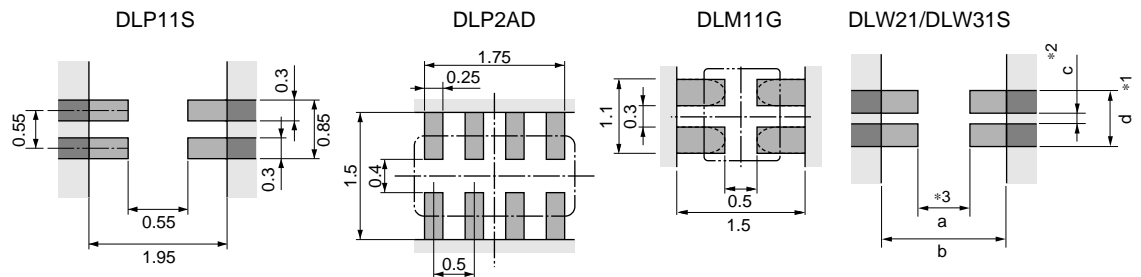


DLM11G
DLM2HG
DLP31S
DLP31D
DLP11S
DLP2AD
DLW21S
DLW21H
DLW31S
DLW5AH
DLW5BS
DLW5BT

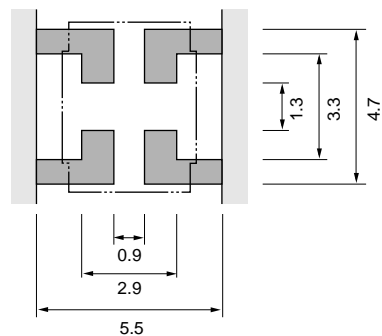
● Reflow and Flow



● Reflow Soldering



DLW5AH/5BS/5BT



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

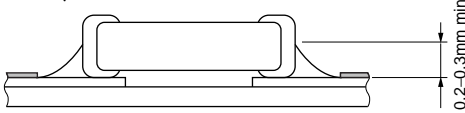
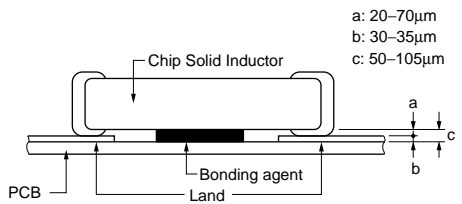
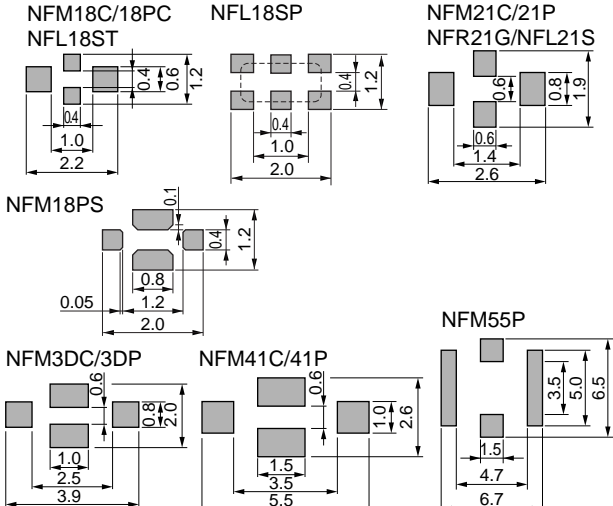
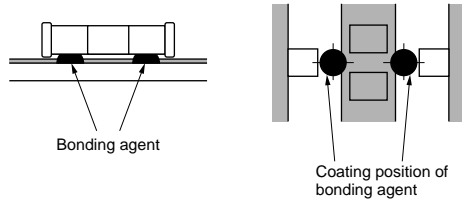
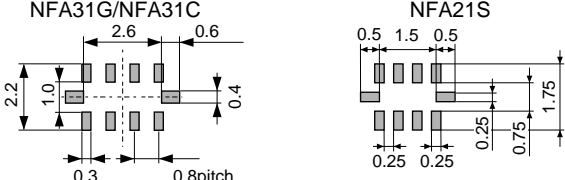
copper foil patterns.

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

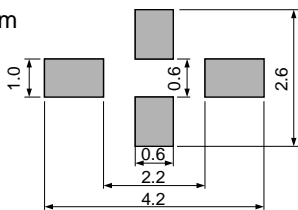
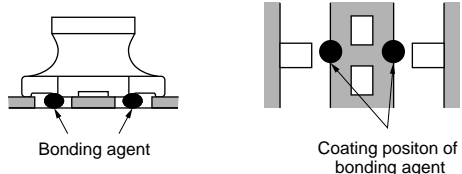
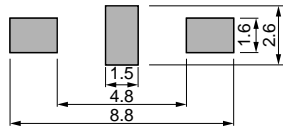
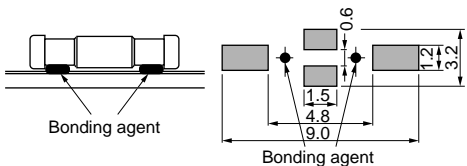
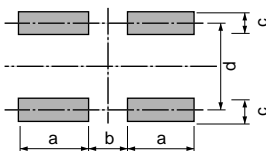
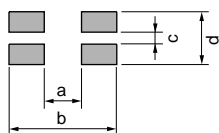
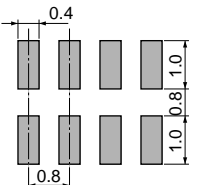
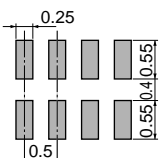
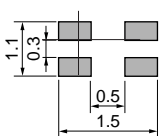
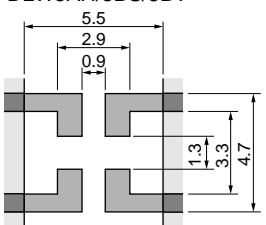
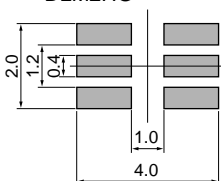
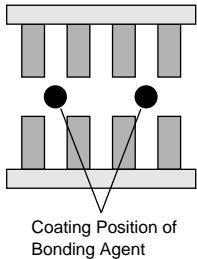
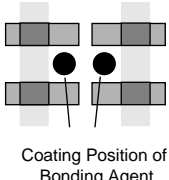
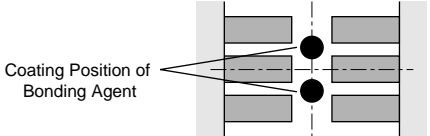
If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability.

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 with solder paste to the following thickness: 100-150μm: BLM03 100-200μm: BLM15/18/21/31/41, BLA 	<p>Coating amount is illustrated in the following diagram.</p>  <p>a: 20-70μm b: 30-35μm c: 50-105μm</p>
NFM NFR NFL	<ul style="list-style-type: none"> ●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing. ●Coat with solder paste to the following thickness: 100-150μm: NFM18/21/3D,NFR, NFL 150-200μm: NFM55P 100-200μm: NFM41 	<p>Apply 0.1mg for NFM41C/41P and 0.06mg for NFM3DC/3DP of bonding agent at each chip. Do not cover electrodes.</p> 
NFA	<ul style="list-style-type: none"> ●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing. ●Coat with solder paste to the following thickness: 100-200μm: NFA31G/NFA31C 100-150μm: NFA21S 	

Continued on the following page. ↗

Series	Solder Paste Printing	Adhesive Application																														
NFW31S NFE31P	<ul style="list-style-type: none">●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.●Coat with solder paste to the following thickness: 150-200μm 	NFW31S Series Apply 0.2mg of bonding agent at each chip. 																														
NFE61P NFE61H	<ul style="list-style-type: none">●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.●Coat with solder paste to the following thickness: 150-200μm 	Apply 1.0mg of bonding agent at each chip. 																														
DLP DLW DLM	<ul style="list-style-type: none">●Use Sn/Pb=60/40 or Sn-3.0Ag-0.5Cu solder for pattern printing.●Coat with solder paste to the following thickness: 100-150μm: DLW21S/21H/31S, DLP11S, DLP2AD 150-200μm: DLP31D/31S, DLM2HG, DLW5AH/5BS/5BT <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><div><p>DLP11S/31S</p></div><div><p>DLW21S/21H/31S</p></div></div> <table><tr><th>Series</th><th>a</th><th>b</th><th>c</th><th>d</th></tr><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></table> <table><tr><th>Series</th><th>a</th><th>b</th><th>c</th><th>d</th></tr><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></table> <div><div><p>DLP31D</p></div><div><p>DLP2AD</p></div><div><p>DLM11G</p></div></div> <div><div><p>DLW5AH/5BS/5BT</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></div><div><p>DLP31S</p></div></div> <div><p>DLM2HG</p></div>
Series	a	b	c	d																												
DLP11S	0.7	0.55	0.3	0.55																												
DLP31S	1.0	0.6	0.7	2.1																												
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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.

Solder: H60A H63A solder (JIS Z 3238)

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

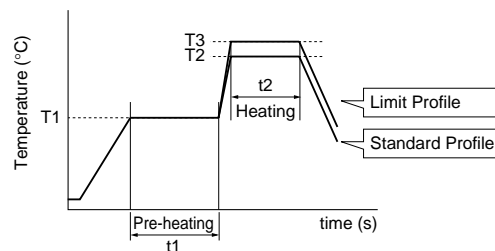
Flux:

- 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)	
BLM (Except BLM03/15/18G) BLA31 NFM3DC/3DP NFM41C/41P NFE61H*/61P DLM2HG DLP31D/31S	150°C	60s min.	250°C	4 to 6s	2 times	265±3°C	5s max.	2 times
NFW31S	150°C	60s min.	250°C	4 to 6s	2 times	265±3°C	5s max.	1 times

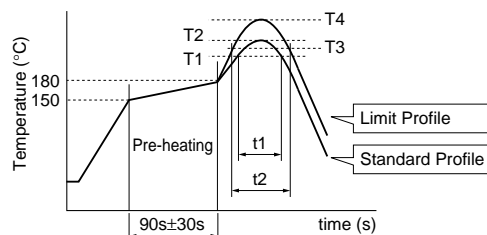
*Except NFE61HT332

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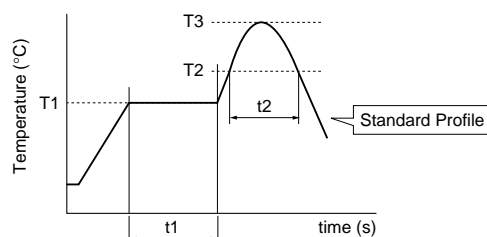
● Reflow Soldering profile

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.

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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

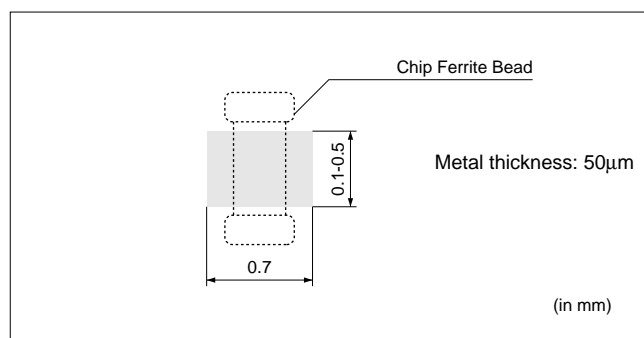
- (4) Ensure that flux residue is completely removed.
Component should be thoroughly dried after aqueous agent has been removed with deionized water.
- (5) Some products may become slightly whitened.
However, product performance or usage is not affected.
For additional cleaning methods, please contact 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.