

## Lead-Free Products

[Lead Insertion Type](#) | [Surface Mount Type](#) | [Surface Mount Type\(Non-Lead Type\)](#) |

[Recommended Soldering Condition](#) | [Soldering Temperature Profile of Iron](#) | [Recommended Soldering](#)

[Methods](#) | [Dry pack1](#) |

[Dry pack2](#) | [Lead-Free Specifications](#) |

### Schedule for Lead-Free

The mass production of a lead free product is already started. However, time of mass production start varies from product to product. Accordingly, please make contact with us about detailed information on mass production schedule for each lead-free product.

### Definition of lead-free components

JEITA (Japan Electronics and Information Technology Industries Association) defines lead-free components in the publication "Guidance for the Lead-Free Marking of Materials, Components and Mounted Boards used in Electronics and Electronic Equipment" (issued in June 2004).

·Lead-free

The state in which the content of lead (Pb) in solders and other relevant parts of an electronic component (including terminals and leads) is less than 0.1% of its weight.

·Phase of lead-free adoption

Levels of lead-free adoption are classified by JEITA as Phase 1, Phase 2, Phase 3 and Phase 3A. New Japan Radio is categorised under Phase3A or Phase3.

Please make contact with us about detail information on each device.

[page top](#)

### Lead-Free Specifications

## Lead Insertion Type

[Sn2Bi\(Bi Target 2wt%\)](#) | [Sn2.5Ag\(Ag Target 2.5wt% \)](#) | [Sn3.5Ag \(Ag Target 3.5wt%\)](#) | [Pure Sn](#)

### DIP

Package Name	Terminal Finish
DIP8	Sn2Bi
DIP14	Sn2Bi
DIP16	Sn2Bi
DIP16-D2	Pure Sn
DIP16-D3	Pure Sn
DIP18	Sn2Bi
DIP20	Sn2Bi
DIP22	Sn2Bi
DIP22-D2	Pure Sn
DIP40	Sn2.5Ag

### SDIP

Package Name	Terminal Finish
SDIP22	Sn2Bi
SDIP24	Sn2.5Ag
SDIP28	Sn2Bi
SDIP30	Sn2Bi
SDIP32	Sn2Bi
SDIP32	Sn2.5Ag
SDIP42	Sn2.5Ag

### SIP

Package Name	Terminal Finish
SIP8	Sn2Bi

### TO-220F

Package Name	Terminal Finish
TO220F(3pin)	Sn2Bi
TO220F(4pin)	Sn2Bi
TO220(5pin)	Pure Sn

### ZIP

Package Name	Terminal Finish
ZIP16	Sn2Bi

### TO-92

Package Name	Terminal Finish
TO92	Sn2Bi
	Pure Sn

[page top](#)

## Surface Mount Type

[Sn2Bi\(Bi Target 2wt%\)](#) | [Sn2.5Ag\(Ag Target 2.5wt% \)](#) | [Sn3.5Ag \(Ag Target 3.5wt%\)](#) | [Pure Sn](#)

### DMP

Package Name	Terminal Finish
DMP8	Sn2Bi
DMP14	Sn2Bi
DMP16	Sn2Bi

### QFP

Package Name	Terminal Finish
QFP32-J2	Sn2.5Ag
QFP32-R1	Pure Sn
QFP44-A1	Sn2.5Ag

### SOT

Package Name	Terminal Finish
SOT-23	Sn2Bi
SOT-23-6	Sn2Bi
SOT-23-6-1	Sn2Bi

DMP20	Sn2Bi
DMP24	Sn2Bi
DMP42	Sn2Bi

#### EMP

Package Name	Terminal Finish
EMP8	Sn2Bi
EMP14	Sn2Bi
EMP16-E2	Sn2Bi
EMP20-E2	Sn2Bi
EMP24-E2	Sn2Bi
EMP24-E3	Sn2Bi

#### FLP

Package Name	Terminal Finish
FLP6-B2	Sn2Bi
FLP10-C1	Sn2Bi

#### PLCC

Package Name	Terminal Finish
PLCC28	Sn2Bi

#### SC82AB

Package Name	Terminal Finish
SC82AB	Sn2Bi
SC88A	Sn2Bi

QFP48-J1	Sn2.5Ag
QFP48-P1	Sn3.5Ag
QFP48-R2	Sn2Bi
QFP52-S1	Pure Sn
QFP56-A1	Sn2.5Ag
QFP64-C1	Sn2Bi
QFP64-C2	Sn2Bi
QFP64-G1	Sn2Bi
QFP64-H1	Sn3.5Ag
QFP80-C1	Sn2Bi
QFP80-C2	Sn2Bi
QFP80-G1	Sn2Bi
QFP100-C1	Sn2Bi
QFP100-C2	Sn2Bi
QFP100-G1	Sn2Bi

#### SDMP

Package Name	Terminal Finish
SDMP30	Sn2Bi

#### SOP

Package Name	Terminal Finish
SOP8	Sn2.5Ag
SOP18	Sn2.5Ag
SOP20	Sn2.5Ag
SOP22	Sn2.5Ag
SOP28	Sn2.5Ag
SOP40-K1	Sn2Bi

#### SOT89

Package Name	Terminal Finish
SOT89(3pin)	Sn2Bi
SOT89(5pin)	Sn2Bi

#### SSOP

Package Name	Terminal Finish
SSOP8	Sn2Bi
SSOP10	Sn2Bi
SSOP14	Sn2Bi
SSOP16	Sn2Bi
SSOP20	Sn2Bi
SSOP20-B2	Sn2Bi
SSOP20-F1	Sn2.5Ag
SSOP20-M1	Pure Sn
SSOP24	Sn2.5Ag
SSOP24-E1	Sn2.5Ag
SSOP28	Sn2.5Ag
SSOP32	Sn2Bi
SSOP44	Sn2Bi

#### TO252

Package Name	Terminal Finish
TO252(3pin)	Sn2Bi
TO252(5pin)	Sn2Bi

#### TVSP

Package Name	Terminal Finish
TVSP8	Sn2Bi
TVSP10	Sn2Bi

#### VSP

Package Name	Terminal Finish
VSP8	Sn2Bi
VSP10	Sn2Bi

[page top](#)

### Surface Mount Type(Non-Lead Type)

Sn2Bi(Bi Target 2wt%) | Sn2.5Ag(Ag Target 2.5wt%)

#### FFP

Package Name	Terminal Finish
FFP12-B1	W/Ni/Au
FFP12-B4	W/Ni/Au
FFP16-C1	W/Ni/Au
FFP24-E1	W/Ni/Au
FFP32-G1	W/Ni/Au

#### USB

Package Name	Terminal Finish
USB6-D3	Cu/Ni/Au
USB8-B3	Cu/Ni/Au
USB8-B6	Cu/Ni/Au
USB10-C3	Cu/Ni/Au
USB12-E3	Cu/Ni/Au

#### QFN

Package Name	Terminal Finish
QFN12	Sn2Bi
QFN20-M1	Sn2Bi
QFN24-T2	Sn2Bi
QFN28-N1	Sn2Bi
QFN28-P4	Sn2Bi
QFN48-Q1	Sn2Bi

#### PCSP

Package Name	Terminal Finish
PCSP14-C3	Cu/Ni/Au
PCSP16-E4	Cu/Ni/Au

#### BCC

Package Name	Terminal Finish
BCC24	Pd/Ni/Pd/Au
BCC32	Pd/Ni/Pd/Au

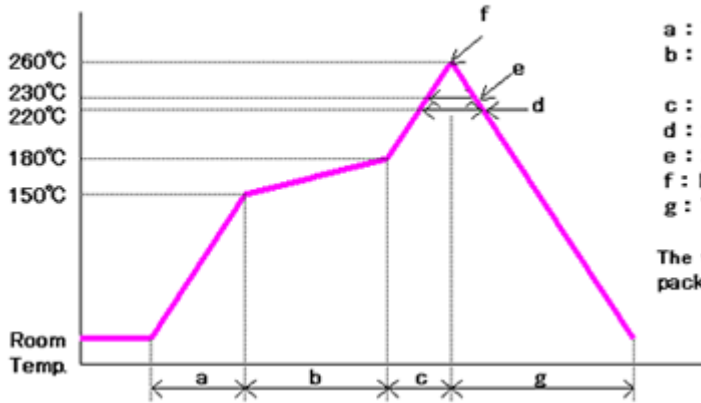
#### SON

Package Name	Terminal Finish
SON6	Sn2.5Ag

[page top](#)

**Recommended Soldering Condition**

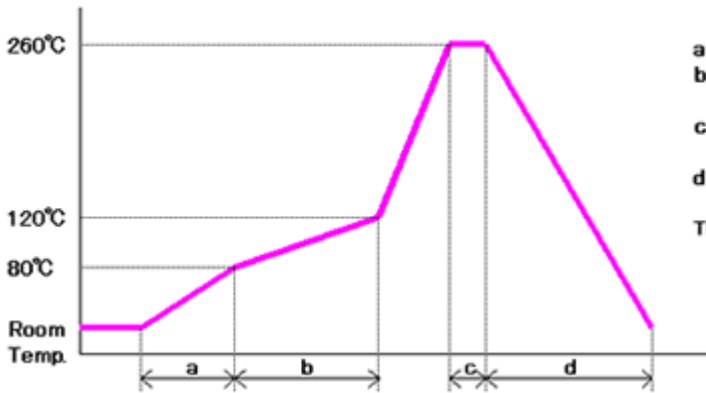
**Soldering Temperature Profile of Reflow**



- a : Temperature ramping rate 1 to 4°C/s
- b : Pre-heating temperature 150 to 180°C  
time 60 to 120s
- c : Temperature ramp rate 1 to 4°C/s
- d : 220 or higher time Shorter than 60s
- e : 230 or higher time Shorter than 40s
- f : Peak temperature Lower than 260° C
- g : Temperature ramping rate 1 to 6° C /s

The temperature indicates at the surface of mold package.

**Soldering Temperature Profile of Flow**



- a : Temperature ramping rate 1 to 7° C /s
- b : Pre-heating temperature 80 to 120° C  
time 60 to 120s
- c : Peak temperature Lower than 260° C  
time Shorter than 10s
- d : Temperature ramping rate 1 to 7°C/s

The temperature indicates at solder joint.

**Soldering Temperature Profile of Iron**

Recommended iron soldering temperature profile is in the following.

At 1 lead Temperature: Lower than 350°C Time: within 3s

[page top](#)

**Recommended Soldering Methods**

Please make contact with us about detail information on each device.

○ : This method is allowed - : This method is not allowed ○ : This method is allowed - : This method is not allowed

Package Name	Reflow soldering	Flow soldering	Iron soldering	Packing condition
DIP8	-	○	○	Non dry pack
DIP14	-	○	○	
DIP16	-	○	○	
DIP16-D2	-	○	○	
DIP16-D3	-	○	○	

Package Name	Reflow soldering	Flow soldering	Iron soldering	Packing condition
EMP8	○	○	○	Non dry pack
EMP14	○	○	○	
EMP16-E2	○	○	○	
EMP20-E2	○	○	○	
EMP24-E2	○	○	○	

DIP18	-	o	o
DIP20	-	o	o
DIP22	-	o	o
DIP22-D2	-	o	o
DIP40	-	o	o
RO220F(3pin)	-	o	o
RO220F(4pin)	-	o	o
RO220(5pin)	-	o	o
RO92	-	o	o
SDIP22	-	o	o
SDIP24	-	o	o
SDIP28	-	o	o
SDIP30	-	o	o
SDIP32	-	o	o
SDIP42	-	o	o
SIP8	-	o	o
ZIP16	-	o	o
DMP8	o	o	o
DMP14	o	o	o
DMP16	o	o	o
DMP20	o	o	o
DMP24	o	o	o
DMP42	o	o	o

o : This method is allowed - : This method is not allowed

Package Name	Reflow soldering	Flow soldering	Iron soldering	Packing condition
SOT-23	o	o	o	
SOT-23-6	o	o	o	
SOT-23-6-1	o	o	o	
SC82AB	o	Under evaluation	o	
SC88A	o	o	o	Non dry pack
SDMP30	o	o	o	
SOP8	o	o	o	
SOP18	o	o	o	
SOP20	o	o	o	
SOP22	o	o	o	
SOP28	o	o	o	
SOP40-K1	o	o	o	Dry pack 1
SOT89(3pin)	o	o	o	Non dry pack
SOT89(5pin)	o	o	o	
SSOP8	o	o	o	
SSOP10	o	o	o	
SSOP14	o	o	o	
SSOP16	o	o	o	
SSOP20	o	-	o	
SSOP20-B2	o	-	o	
SSOP20-F1	o	-	o	
SSOP20-M1	o	o	o	
SSOP24	o	-	o	
SSOP24-E1	o	-	o	

EMP24-E3	o	o	o	
FLP6-B2	o	-	o	
FLP10-C1	o	-	o	
PLCC28	o	o	o	
QFP32-J2	o	-	o	
QFP32-R1	o	-	o	Dry pack 2
QFP44-A1	o	-	o	Dry pack 1
QFP48-J1	o	-	o	Non dry pack
QFP48-P1	o	-	o	Dry pack 2
QFP48-R2	o	-	o	Dry pack 1
QFP52-S1	o	-	o	Dry pack 2
QFP56-A1	o	-	o	Dry pack 1
QFP64-C1	o	-	o	
QFP64-C2	o	-	o	Dry pack 2
QFP64-G1	o	-	o	
QFP64-H1	o	-	o	Dry pack 1
QFP80-C1	o	-	o	
QFP80-C2	o	-	o	
QFP80-G1	o	-	o	
QFP100-C1	o	-	o	Dry pack 2
QFP100-C2	o	-	o	
QFP100-G1	o	-	o	

o : This method is allowed - : This method is not allowed

Package Name	Reflow soldering	Flow soldering	Iron soldering	Packing condition
VSP8	o	o	o	
VSP10	o	o	o	
FFP12-B1	o	-	-	
FFP12-B4	o	-	-	
FFP16-C1	o	-	-	
FFP24-E1	o	-	-	
FFP32-G1	o	-	-	
PCSP14-C3	o	-	-	
PCSP16-E4	o	-	-	
USB6-D3	o	-	-	
USB8-B3	o	-	-	
USB8-B6	o	-	-	
USB10-C3	o	-	-	Non dry pack
USB12-E3	o	-	-	
BCC24	o	-	-	
BCC32	o	-	-	
BCC36	o	-	-	
QFN12	o	-	-	
QFN20-M1	o	-	-	
QFN24-T2	o	-	-	
QFN28-N1	o	-	-	
QFN28-P4	o	-	-	
QFN48-Q1	o	-	-	
SON6	o	o	o	
SON10	o	o	o	

3SOP28	○	○	○	
3SOP32	○	○	○	Dry pack
3SOP44	○	○	○	1
				Non dry
				pack
RO252(3pin)	○	○	○	Dry pack
				1
RO252(5pin)	○	○	○	Non dry
RVSP8	○	○	○	pack
RVSP10	○	○	○	

### Dry pack1

IC Storage Conditions and Duration for Deaeration Packing

1)Mounting

Be sure to apply soldering within one month after opening.

2)Storage

It is better to keep IC's at following condition.

Before unpacking : Temperature : 5 - 40℃, Humidity : 40 - 80%

After unpacking : Temperature : 5 - 40℃, Humidity : 40 - 60%

### Dry pack2

IC Storage Conditions and Duration for Moisture-Proof Packing

1)Mounting

Be sure to use within 7days after opening and to apply 2nd soldering within 3days.

Be sure to apply soldering within twice.

2)Storage

It is better to keep IC's at following condition.

Before unpacking : Temperature : 5 - 40℃, Humidity : within 80%

After unpacking : Temperature : 5 - 25℃, Humidity : 40 - 60%

3)Baking

In case of keeping except above condition, be sure to apply baking.

Baking Method : Ta = 125℃, over 16h

### Discrimination of lead-free products from conventional products

Ve impress " PB FREE " on each product label.