

QUALITY ASSURANCE TEST INSPECTION

QUALITY ASSURANCE TEST is done for quality assurance of shipped products by using sampling inspection.

<For Power management ICs>

No.	DIVISION	TEST ITEMS	CRITERIA	AQL **
1	Electrical	Major Defect	QAT Specification	0.065% *
		Minor Defect		0.15%
2	Appearance	Major Defect	Visual Inspection Criteria	0.25%
		Minor Defect		0.65%

*) Major Defect (short, open or functionally inoperative) AQL 0.065%

**) AQL : ANSI/ASQC Z1.4-1993

Sampling Plans: Table II -C-Single sampling plans for reduced inspection

Soldering (1)

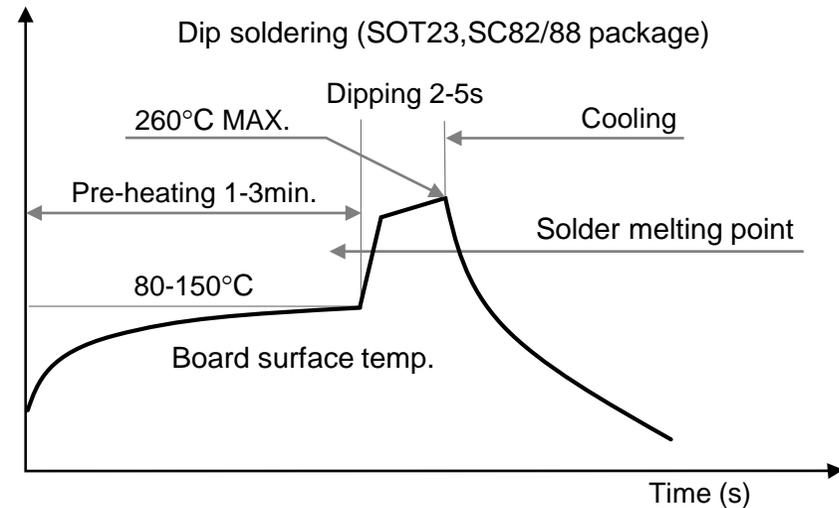
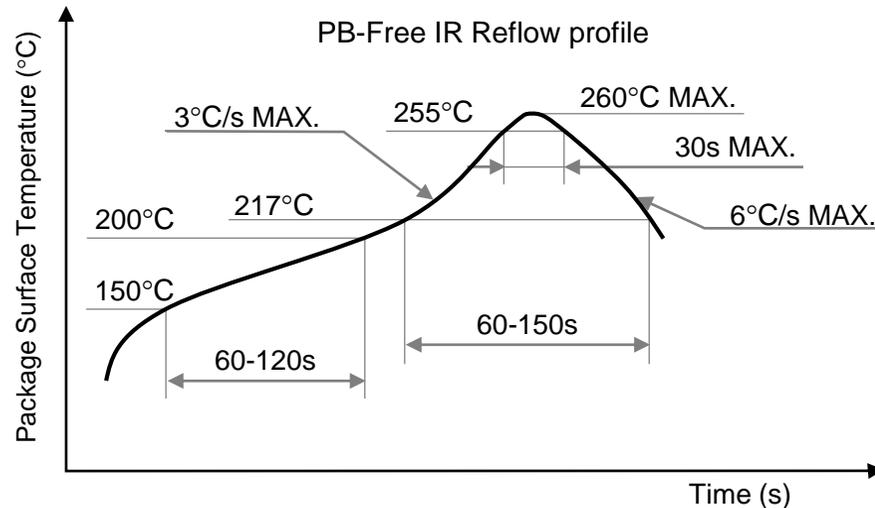
- The surface temperature and exposure time should be kept as below.

Max. temperature	Max. time	Applicable parts
260°C	10s	Body
350°C	5s	Lead (when hand-soldering is necessary)

- solder flux

Don't use halogenous solder flux.

- Heat-resistance profiles



■ MSL (Moisture Sensitivity Level)

Though heating process may be carried out 3 times, in reflow method, be sure to minimize the temperature and the exposure time.

Humidification Conditions	Level		Storage time	Mainly Package
	JEDEC	JEITA		
85°C,85%RH,168h	1	A	Unlimited	SOT-23, SOT-89, SON/HSON, SC82/SC88, DFN, WLCSP, HSOP, TO-252
85°C,65%RH,168h	2	B	1year(*)	-
30°C,70%RH,672h	2a	C	4weeks(*)	SON-22,SOP-14(For RTC module)
30°C,70%RH,336h	-	D	2weeks(*)	-
30°C,70%RH,168h	3	E	168hours(*)	FBGA, QFP
30°C,70%RH, 96h	-	F	96hours(*)	-
30°C,70%RH, 72h	4	G	72hours(*)	-
30°C,70%RH, 48h	5	H	48hours(*)	-
30°C,70%RH, 24h	5a	I	24hours(*)	-
Specified individually	6	S	Time on label(*)	-

(*) Baking: 125°C, 10h

■ The board cleaning conditions.

- We recommend alternative CFCs substitute for solvent.
Ex. ST-100s (Arakawa)
- Don't use trichloroethylene, trichloroethane, etc.
- Cleaning time should be less than 180s.
(including in solvent, in vapor and in ultrasonic bath).
- Ultrasonic cleaning is usable.
Frequency 28 to 40 kHz (resonant damage should be avoided)
Power 15W/liter (MAX.)
Time 60s (MAX.)

(Note) The above cleaning condition is just reference. Please confirm the following items.

- Set the proper cleaning condition according to the recommendation of the cleaner maker.
- Take notice that mark legibility can be degraded by cleaning.
- Please be careful not to remain corrosive constituents.

■ Storage

- Please be sure to store devices in proper conditions to maintain device quality.

Ambient temperature 5 to 35°C

Humidity 45 to 75%RH

(Note) Pay attention to the following items.

- If humidifiers are being used, provide pure water or boiled water.
- Keep away from corrosive gas exposure.
- Maintain the temperature stabilized.
- Keep away from excessive electromagnetic wave exposure.
- Keep away from excessive load and impact.

■ Countermeasures against ESD protection

- The devices should be handled by the necessary ESD precautions and in the condition of greater than 40%RH relative humidity.

Precautions in Mounting (1)

1. When conducting infrared ray reflow, control the temperatures of individual components with utmost care in case any differences between the resin surfaces of packages and the metal surfaces of leads in the degree of their infrared ray absorption may cause the former to have much higher temperatures than the latter.
2. Notwithstanding the heat-resistance profiles for reflow processes in mounting packages, set an actual temperature profile in consideration of various incidental factors to prohibit reliability problems.
3. When mounting pin-inserted type packages in the process of dip soldering in which their leads are inserted into through holes on printed circuit boards and then soaked for soldering into solder liquid in a jet soldering bath, take care to avoid direct contact of their main body with the jet solder.
4. When using a soldering iron, confirm that it is sufficiently insulated against electrostatic buildup and take utmost care to prevent any surge in its power supply from being applied to integrated circuits.
5. When mounting packages on any equipment intended for operation at high humidities, strive to avoid electric leakage or lead corrosion by resin-coating printed circuit boards after taking appropriate measures for leaving no flux residues.
6. When mounting packages on any equipment intended to enable integrated circuit inspection in the midair as well as lead inspection with image recognition adopted for positioning printed circuit boards and packages, adopt a virtual planar inspection method assuming planar placement of integrated circuits. Note that the results of integrated circuit inspection by the virtual planar inspection method may differ from those of any other inspection method.
7. The X-ray exposure can influence functions and characteristics of the products. Confirm the product functions and characteristics in the evaluation stage.
8. There can be variation in the marking when different AOI (Automated Optical Inspection) equipment is used. In the case of recognizing the marking characteristic with AOI, please contact RICOH sales or our distributor before attempting to use AOI.

9. Please be careful that the following environment or handling may affect internal metal corrosion of semiconductor devices.
 - a. When using any flux, note that rosin-based flux is recommended. Please be careful not to remain corrosive constituents.
 - b. Additionally, the product should not be used in the following environments.
 - Corrosive environment (salty air, oil, rubber, automotive exhaust gases, human contamination and the like) that contains plenty of chemical constituents including, but not limited to, chlorine, sulfur and phosphorus
 - Dew condensation environment
 - Dusty area
 - In liquid
 - c. When using any coating or underfill to improve moisture resistance or joining strength, evaluate them adequately before using. In certain materials or coating conditions, corrosion by contained constituents, current leakage by moisture absorption, crack and delamination by physical stress can happen.
 - d. If humidifiers are being used, provide pure water or boiled water. Keep away from corrosive gas exposure.
 - e. Please be careful not to remain corrosive constituents.
 - f. Use of halogen-free paste and halogen-free printed boards are recommended during board mounting.
 - g. In case of handling products, do not touch products directly with bare hands.

When handling integrated circuits, wear antistatic work cloths in case an open state of pins during measurement and incorporation of integrated circuits may increase the possibilities of electrostatic breakdowns.

At the same time, ensure that the human body is grounded through a 1-megohm resistor placed in its vicinity. Otherwise, electric leakage may subject the human body to electric shocks coming from conductive outfits such as rings and bracelets.

Further, be sure to handle integrated circuits on properly grounded conductive mats and avoid direct contact with pins on integrated circuits. Note that electrification from the human body or clothing amounts to several thousand volts or more.

When unpacking this product, also take care not to suffer injuries from projections and other obstacles.

■ Precautions in Measurement

Be sure to ground measuring instruments to prevent integrated circuits from being impressed with any surge due to electric leakage. Particularly when powering on and off measuring instruments, use a clamping circuit to also prevent integrated circuits from being impressed with any voltage or current exceeding their maximum rating from measuring instruments.

Further, take utmost care to avoid inverse or wrong orientations of integrated circuits and short circuits between pins as well as bending, floating, and deformation of leads.

■ Precautions in Transportation

When transporting integrated circuits and mounted substrates, pack them in conductive containers instead of plastic or styrofoam containers, which allow electrostatic buildup during transportation, leading to breakage's of integrated circuits. Similarly, when transporting integrated circuits and mounted substrates on a belt conveyer, provide it with appropriate antistatic measures or pack integrated circuits in conductive containers before placing them on the belt conveyer in case its rubber belt may bear electric charges.

Take utmost care to prevent vibrations or shocks from being applied to integrated circuits and mounted substrates.

When powering on and off equipment on which are mounted packages, prevent integrated circuits from being impressed with any voltage or current exceeding their maximum rating. When integrated circuits are subject to any surge, protect them by means of filters, resistors, and capacitors.

Additionally, the product should not be used in the following environments.

- Strong static electricity, electromagnetic wave and electromagnetic field environment.
- Corrosive environment (salty air, oil, rubber, automotive exhaust gases, human contamination and the like) that contains plenty of chemical constituents including, but not limited to, chlorine, sulfur and phosphorus.
- Dew condensation environment.
- Dusty area.
- In liquid.
- Lay out the product near a combustible material.