Lever Actuated Land Grid Array LGA2011 Socket

1. INTRODUCTION

This specification covers the requirements for application of LGA2011 Socket onto printed circuit board (PCB).

The Socket accepts 2011-position CPU package with 1.016mm x 0.8814mm hexagonal pattern.

Please see detailed installation process of CPU package in instruction sheet 411-78373.

1.1. Parts number and description

Table1 Part number and description

Part Number	Description	
1554653-X (*1)	LGA 2011 Socket	Socket R0
2174988-X (*1)		Socket R1
2201838-X (*1)		Socket R3
2134439-1 (*1)	Socket R0 ILM assy	Narrow type
2134439-2 (*1)		Wide type
2229339-1 (*1)	Socket R3 ILM assy	Narrow type
2229339-2 (*1)		Wide type
2134440-X (*1)	Back plate assy	

*1: Refer to customer drawing for detail.

1.2. Outline

LGA2011 Socket provides solder balls on bottom of Socket contacts to be soldering onto PCB pad. The housing holds an array of the contacts.

1.3. Notices

The Sockets are placed on the PCB board by automatic application tooling (typically vacuum pick and place). The PnP cap on the Socket is used to facilitate this process. The Socket must be with PnP cap attached before mounting on the PCB board.

1.4. Prohibitions

Do not touch contacts and solder balls

To prevent contact deformation and solder ball deformation, refrain to touch contacts and solder balls.

Basic terms and features of this product are provided as below.

Socket with PnP cap

ILM assy narrow type with ILM Cover HSG

ILM assy wide type with ILM Cover HSG

Back plate assy

Figure2 Components

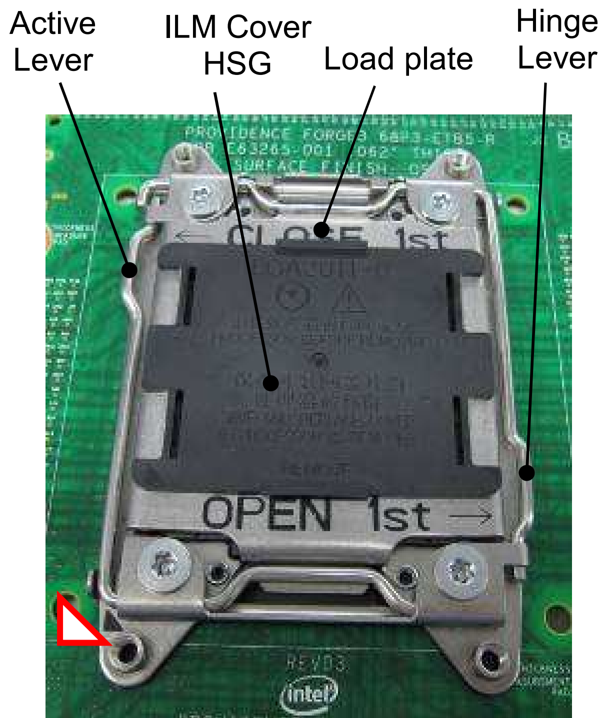


Figure3a Socket with ILM Cover HSG

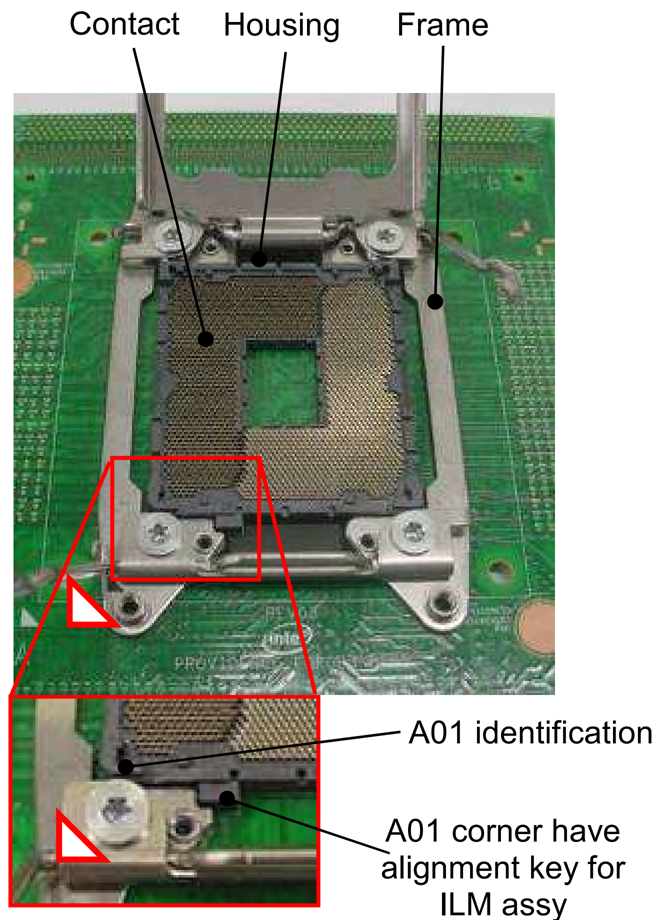


Figure3b Socket without PnP cap

Note: This Socket is provided to customer with PnP cap attached.

Remove the PnP cap right before the CPU is installed.

2. REFERENCE MATERIAL

2.1. Drawings

Customer Drawings for product part numbers are available from service network. If there is a conflict between the information contained in the Customer Drawings and the specification or with any other technical documentation supplied, the Customer Drawings shall take precedence.

2.2. Specification

Reference documents which pertain to this product are:

108-78750: Product specification

501-78294: Qualification test report

411-78373: Instruction sheet

3. REQUIREMENTS

3.1. CPU package

The Socket accepts 2011-position CPU package provided by Intel.

3.2. Storage

A. Preferable condition

The Sockets should remain in the shipping containers and warehouse temperature and humidity should be controlled until ready for use to prevent deformation or oxidation to the solder balls. The Sockets should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

B. Chemical exposure

Prolonged exposure to ultraviolet light may deteriorate the chemical composition used in the Socket material.

Do not store Sockets near any chemical listed below as they may cause stress corrosion cracking in the solder balls.

Alkalies Ammonia Citrates Phosphates Citrates Sulfur Compounds

Amines Carbonates Nitrites Sulfur Nitrites Tartrates

3.3. PCB board

A. Material

The PCB material shall be glass epoxy (FR-4).

B. Thickness

The PCB thickness shall be from 1.6mm to 2.4mm.

C. Pads

The PCB circuit pads must be solder able in accordance with test specification EIA-364-52A.

D. Layouts and the volumetric zone for center cavity component

The circuit pads on the PCB must be precisely located to ensure proper placement and optimum performance of the Socket. The PCB layout must be followed mechanical guide Intel provides.

3.4. Solder paste characteristics

A. For Sockets with lead free solder balls, alloy type shall be Sn/Ag/Cu

(This type of alloy has a melting point temperature of 217deg C)

B. Recommended flux incorporated in the paste should be “no clean” type. Other fluxes, such as rosin mildly active (RMA) type, are acceptable. DO NOT WASH THE SOCKET.

3.5. Stencil design

Recommended stencil design is between 0.12mm and 0.15mm thickness with 0.432mm hole diameter.

3.6. Soldering

The Sockets should be soldered using hot air convection or/and IR oven with a minimum of seven or eight chambers (zone) recommended. The solder paste should be applied using an automatic screening process. Due to many variables involved with the reflow process (i.e. board size and thickness, layout for components), it is recommended that trial runs be conducted under actual manufacturing condition to ensure product and process compatibility. Reference reflow temperature profiles at solder ball positions are shown in the Figure4. Temperature at pick-up cap should be 260degC maximum.

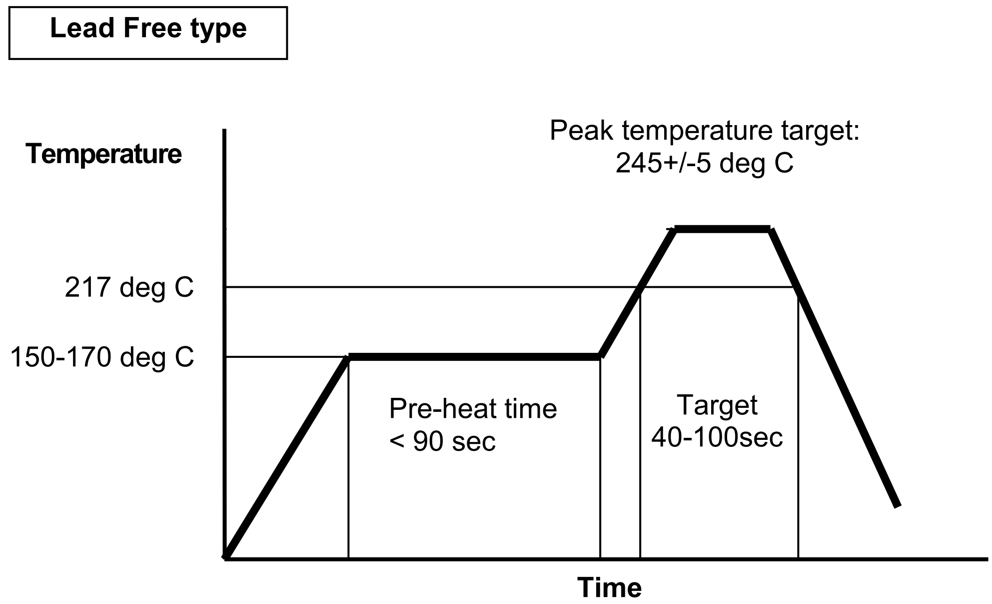
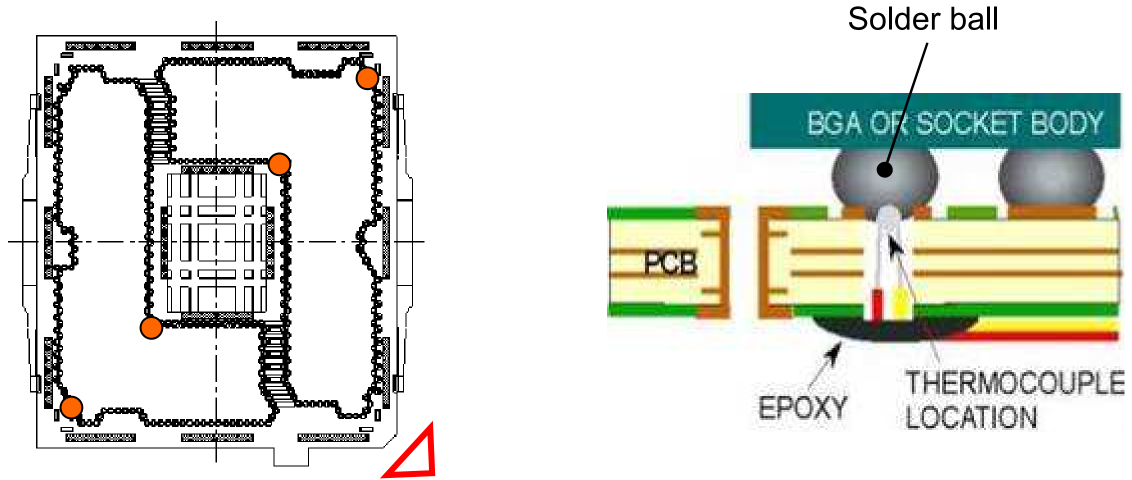


Figure4

Temperature measurement points should be on the surface of the pads under the solder ball of the Socket. (Fig.5)

Temperature range in Socket area should be less than 15deg C



: Recommended measurement position (Ball side view)

Thermo-couple from bottom of PC board

Figure5 Recommended temperature measurement position for SMT

3.7. Socket placement

The Socket is supplied with JEDEC tray. Refer to the customer drawing for the parts position in the tray.

PnP cap assembled on the Socket is for Socket pick and place process. The center of gravity position refers to customer drawing. (Fig.6)

LGA2011 Socket weights up to 19.1g, balance between appropriate nozzle selection and head traverse rate.

The Socket A01 position must be aligned with the A01 position PCB circuit pad. When placing the Socket on the board, make sure that the solder balls are aligned with the matching pads before seating the Socket onto the board.

Caution: The Socket must be handled only by the outer perimeter of the Socket to avoid deformation, contamination, or damage to the solder balls.

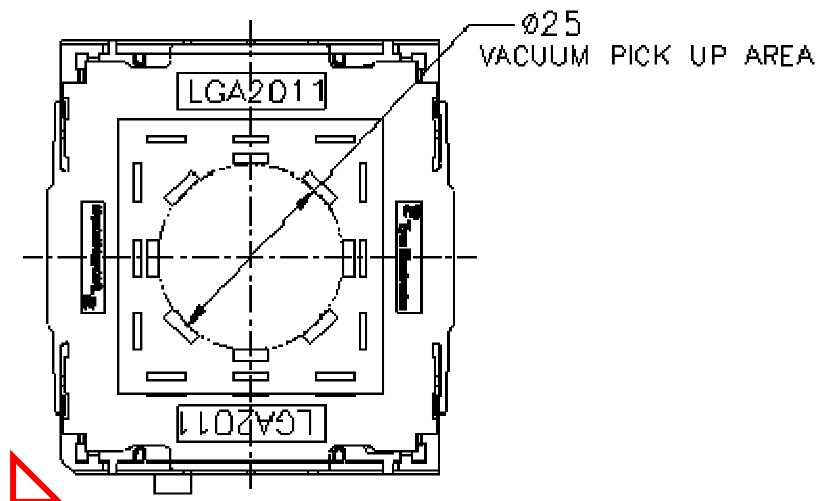


Figure 6. Recommended pick up area.

3.8. Checking Installed Socket

The housing must be seated on the PCB with recommended dimension shown in Figure7.

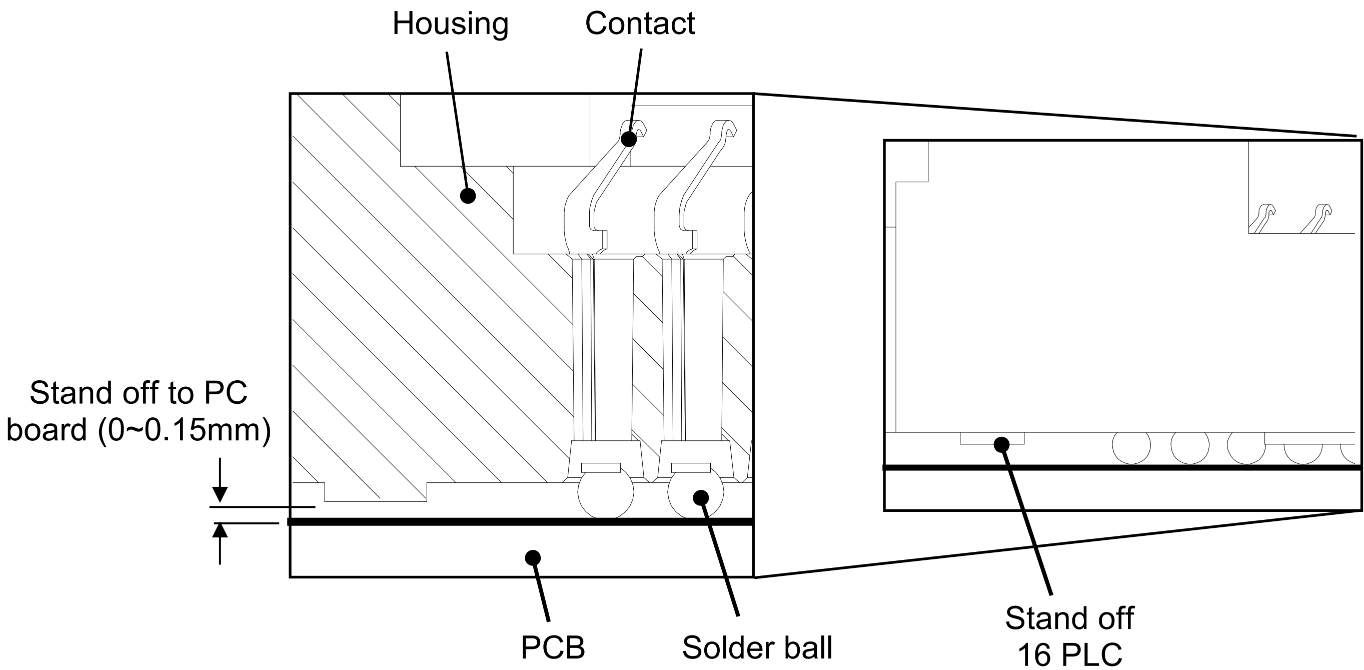


Figure7 After SMT on PCB

The PnP cap on top of the Socket must be removed right before CPU installation (the device must not be installed unless this pick-up cap is removed).

Note: Due to the tight pattern associated with these solder balls, inspection techniques must provide a clear picture of possible areas of shorting, X-ray or electrical test equipment will be used to inspect solder joints.

3.9. Repair or rework

The Socket is not repairable. Discard and replace any defective or damaged Socket. Do not re-use the Socket after removing it from the PCB.

The rework process specification is shown in Table8 for LGA2011 Socket (lead free).

Recommended rework profile measurement positions are at solder ball pad surface, same with Fig5. Housing surface should be monitored also.

Table8

LGA2011 Socket (Lead free) rework process	Specification
Peak Socket body temperature	260deg C
Peak solder joint temperature	228-250 deg C
Time above liquidus	45-280 seconds

Critical ramp rate (210-220 deg C)	0.35-0.75 deg C/second
Placement force	50gf maximum
Peak solder joint temperature at post solidify time	190deg C maximum
Temperature readings difference between Thermo couples	15deg C maximum

3.10. Heat sink load

Static compressive load from heat sink must meet the requirement shown in Table9.

Table9

Minimum static compressive load from heat sink	222N (50lbf)
Maximum static compressive load from heat sink	356N (80lbf)

REV	REV. RECORD	PREPARED		CHECK		APPROVAL	
A	REVISED	S.AIHARA	09 FEB11	Y.SEKIBA	09 FEB11	T.NAKASHIMA	09 FEB11
B	REVISED	M.LU	11 MAR13	Y.SEKIBA	11MAR13	T.NAKASHIMA	11MAR13
C	REVISED	J.WANG	15 SEP14	L.SIMON	15 SEP14	C.WANG	15 SEP14