

Lever Actuated Land Grid Array, LGA115X socket

1. INTRODUCTION

This specification covers the requirements for application of lever-actuated LGA115X Socket onto printed circuit board (PC board). The socket accepts 115X-position LGA package with 0.914mm x 0.914mm grid pattern. LGA115X socket is used with combination of ILM assembly, Back plate assembly, shoulder screw and ILM screw.

1.1. Parts number and description

Table 1. Part number and description

Part Number	Description
2013092-X (*1)	LGA1156 Socket
2069965-X (*1)	LGA1155 Socket
2134928-X (*1)	LGA1150 Socket
2199191-X(*1) 2287402-X(*1)	LGA1151 Socket
2013882-X (*1) 2134397-X (*1)	ILM Assembly for LGA115X
2013883-X (*1)	Back plate Assembly
2013884-X (*1)	Shoulder screw
2040979-X (*1)	ILM screw (*2)

*1 : Refer to customer drawing for detail.

*2 : 2pcs required per socket.

1.2. Outline

LGA115X socket provides solder balls on bottom of socket to make contact to PC board. The housing holds an array of the contact.

1.3. Notices

The sockets are placed on the PC 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 PC board.

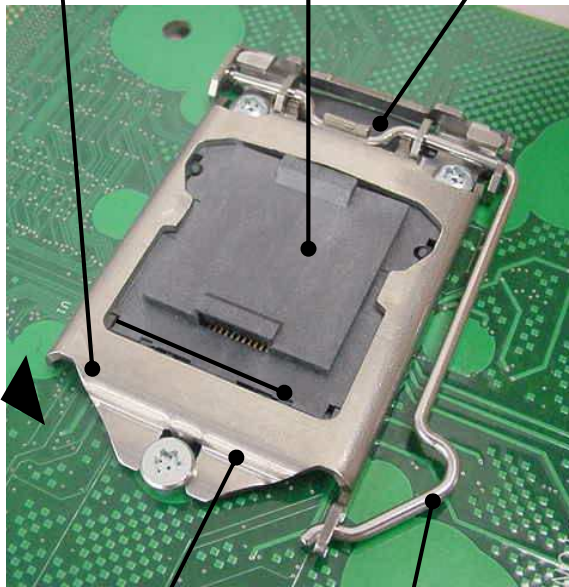
1.4. Prohibitions

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.

Triangle mark
(A01 identification) PnP cap Frame



Load plate Lever

Figure2a. Socket in "Close" position (Top side)

Back plate

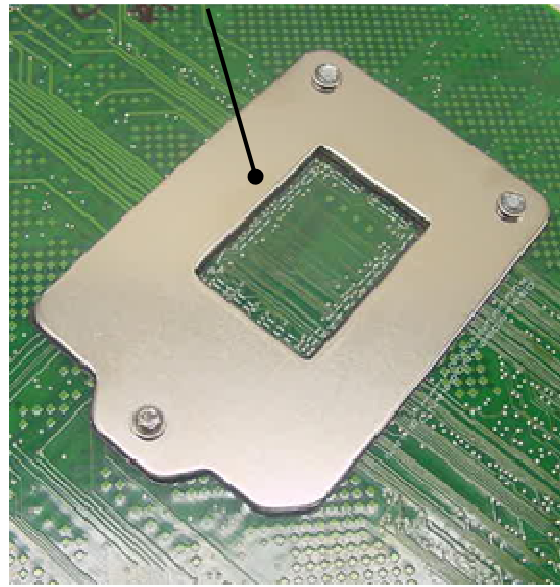


Figure2b. Back plate assy (Bottom side)

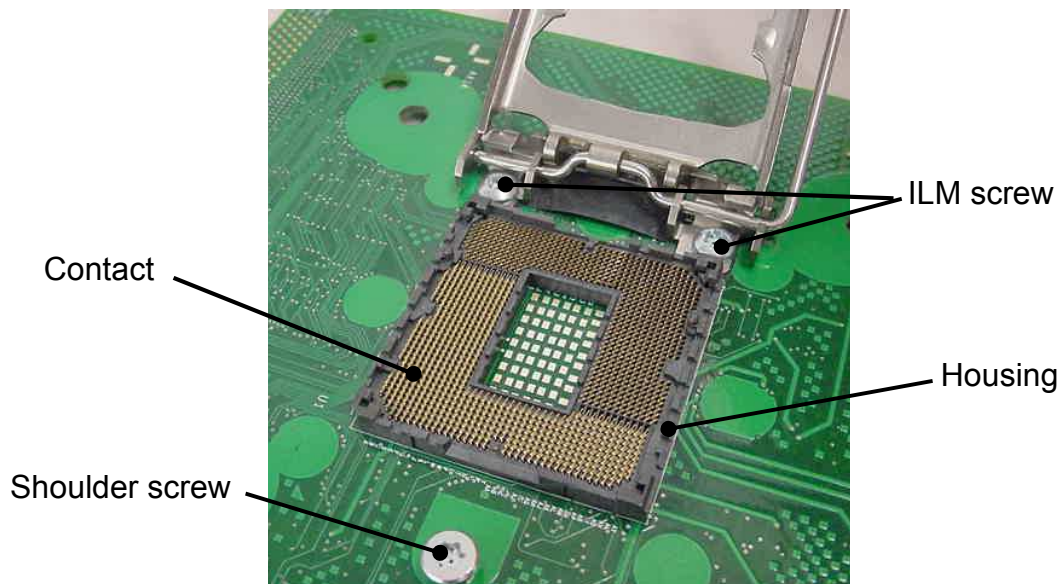


Figure3. Socket in "Open" position (without PnP cap)

*Note: This socket is provided to customer with pick-up cap attached.
Remove the pick-up 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:

- 108-78586 : Product specification
- 501-5953 : Qualification test report
- 411-78321 : Instruction sheet

3. REQUIREMENTS

3.1. LGA package

The socket accept 115X-position LGA package provided by Intel.

3.2. Storage

A. Preferable condition

The sockets should remain in the shipping containers 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. PC board

A. Material

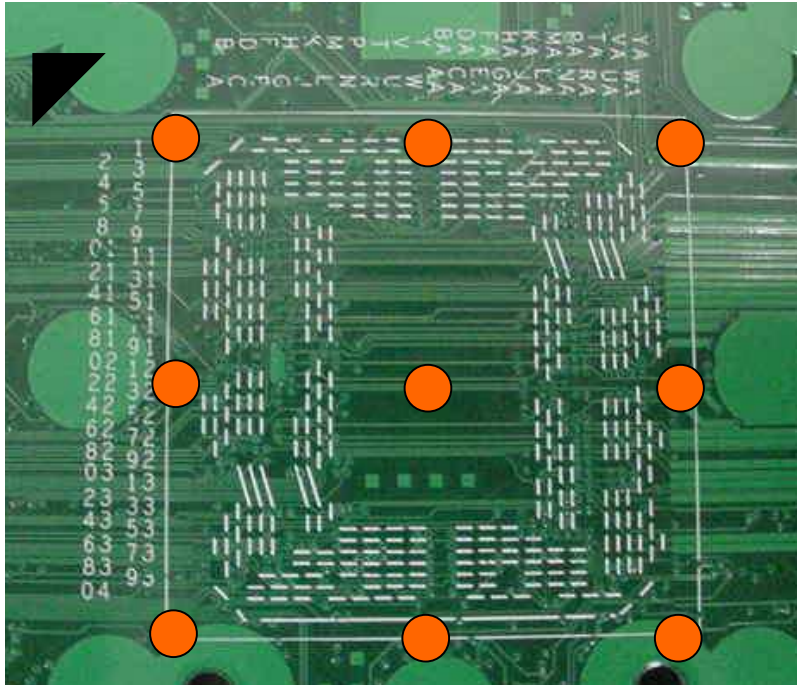
The PC board material shall be glass epoxy (FR-4).

B. Thickness

The PC board thickness shall be from 1.6mm to 2.4mm.

C. Warpage

Maximum allowable bow of the PC board after reflow shall be 0.1mm per 25.4mm over the length of the socket grid area (Fig.4)



● : Recommended measurement position

Figure4. Recommended measurement position of PC board warpage after SMT

D. Pads

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

E. Layouts and the volumetric zone for center cavity component

The circuit pads on the PC board must be precisely located to ensure proper placement and optimum performance of the socket. The PC board 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 0.457mm hole diameter.

3.6. Soldering

The sockets should be soldered using hot air convection or nitrogen 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, component density, count and orientation), 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 Fig.5.

Temperature at pick-up cap should be 260degC maximum.

Lead Free type

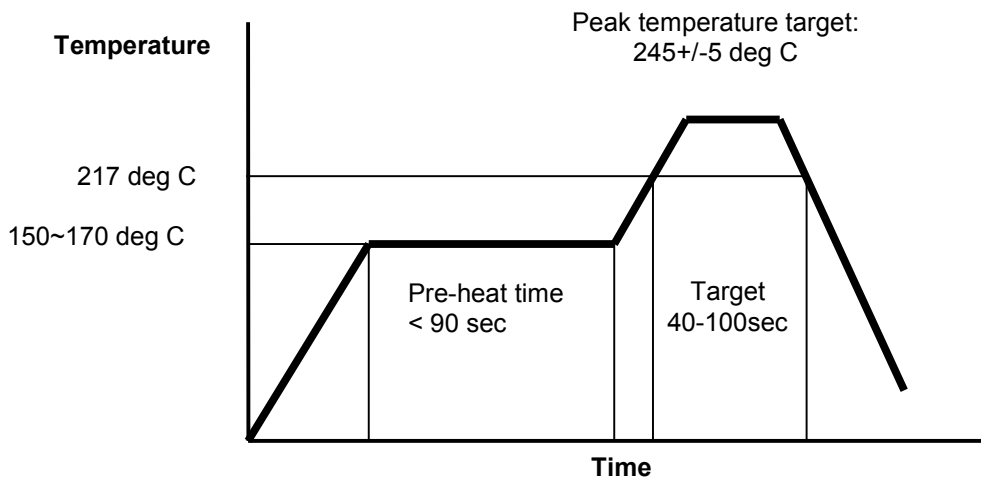


Figure5

Temperature measurement points should be on the surface of the pads under the solder ball of the socket. (Fig.6)

Temperature range in socket area should be less than 15degC

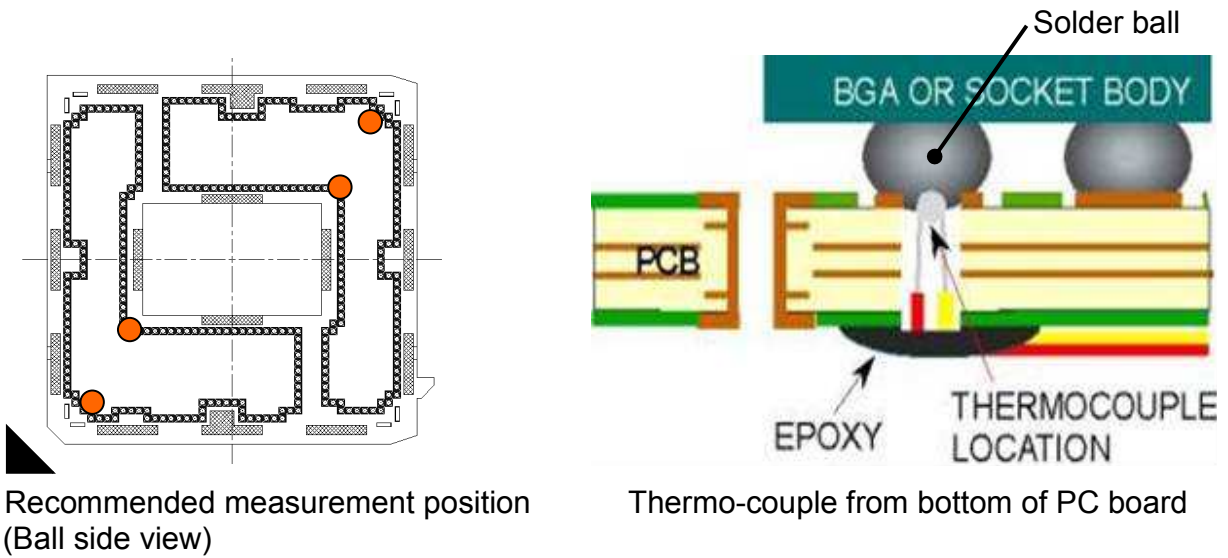


Figure6.Recommended temperature measurement position for SMT

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.7)

LGA115X socket weights up to 9.8g, balance between appropriate nozzle selection and head traverse rate. The socket A01 position must be aligned with the A01 position PC board 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.

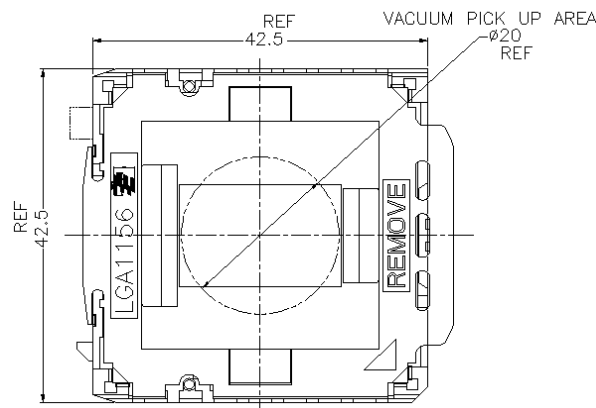


Figure7. Recommended pick up area

3.8. Checking Installed Socket

The housing must be seated on the PC board with recommended dimension shown in Fig.8 .

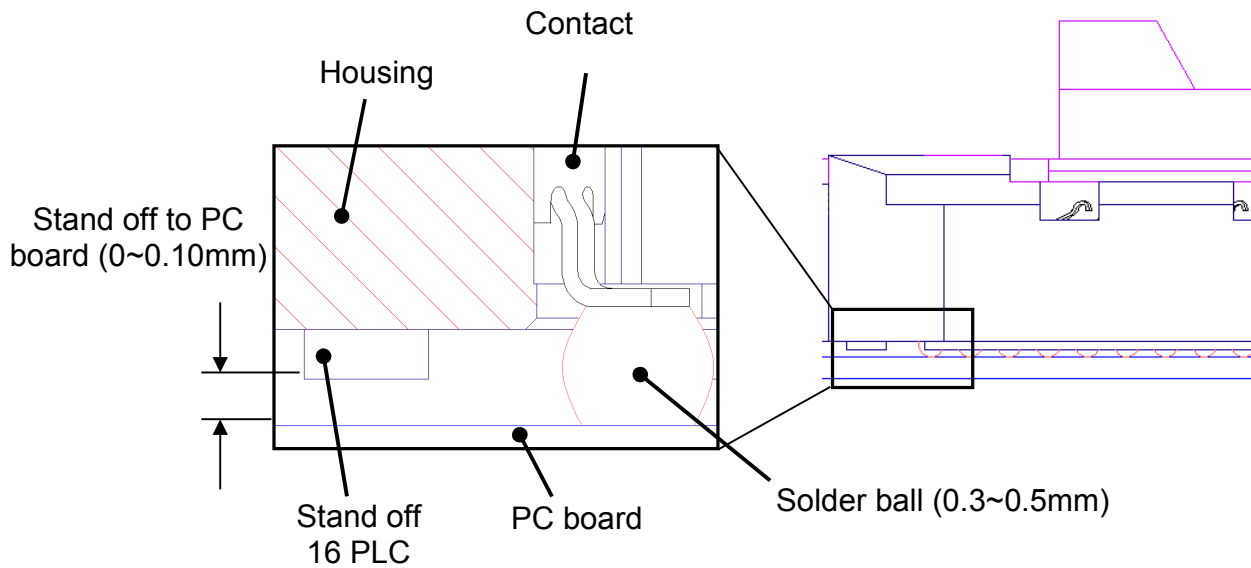


Figure8. After SMT on PC board

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 PC board.

The rework process specification is shown in Table 11 for LGA115X socket (lead free).

Recommended rework profile measurement positions are at solder ball pad surface, same with Fig.6. Housing surface should be monitored also

Table 9

LGA115X socket (Lead free)rework process	Specification
Peak socket body temperature	260degC max.
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, ILM assy and Back plate assy must meet the requirement shown in Table 10.

Table 10

Maximum static total compressive load	756N(18lbf)
Minimum static total compressive load	356N (50lbf)

REV	REV. RECORD	PREPARED		CHECK		APPROVAL	
0	RELEASE	T.SENGOKU	18 th Jun '09	Y.SEKIBA	18 th Jun '09	T.NAKASHIMA	18 th Jun '09
A	REVISED	T.SENGOKU	29 th Sep '09	T.SENGOKU	29 th Sep '09	T.NAKASHIMA	29 th Sep '09
B	REVISED	Y.TAKAHASHI	18 th May '10	Y.SEKIBA	18 th May '10	T.NAKASHIMA	18 th May '10
C	REVISED	Y.TAKAHASHI	1 st Sep '10	H.TAGUCHI	1 st Sep '10	T.NAKASHIMA	1 st Sep '10
D	REVISED	S.AIHARA	19 th Jan '11	Y.SEKIBA	19 th Jan '11	T.NAKASHIMA	19 th Jan '11
E	REVISED	Y.TAKAHASHI	26 th Apr '11	Y.SEKIBA	26 th Apr '11	T.NAKASHIMA	26 th Apr '11
F	REVISED	JEFF WANG	09 th May '14	SIMON LI	09 th May '14	COREL WANG	09 th May '14