



PRODUCT SPECIFICATION

PRODUCT SPECIFICATION

【1. SCOPE】

This specification defines the performance for the microSD + nano SIM + nano SIM 3in3 Combination Socket Stacked, Pin-Eject Type with Tray series.

【2. PRODUCT NAME AND PART NUMBER】

| Product Name | Part Number | |
|-----------------------------------------------------------------------------------|-------------|------------------|
| | Socket | Embossed package |
| mSD/nSIM 3in3 Stacked Socket, Pin-Eject Type with Tray (with 2 DIP Length 0.45mm) | 201458-1114 | 201458-1114 |

【3. RATINGS】

| Item | Standard | |
|------------------------------|-------------------|---------------|
| Rated Voltage (MAX.) | 10 Volts | AC(RMS) or DC |
| Rated Current (MAX.) | 0.5 Amps | |
| Operating temperature Rating | -40°C ~ +85°C *1 | |
| Storage temperature Rating | -40°C ~ +85°C *1 | |
| Relative humidity | 10% to 80% R.H *2 | |

*1 : Including terminal temperature rise.

*2 : Storage area is to be free of corrosive gases and dew formation.

| | | | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------|----------------|----------|--------|--|--|---------------------------------------------------------|--|--------------|-----------------------|---------|
| REV. | A1 | | | | | | | | | |
| SHEET | 21 | | | | | | | | | |
| REVISE ON PC ONLY | | | | | | TITLE: | | | | |
| A1 | | RELEASED | | | | PRODUCT SPECIFICATION FOR 3IN3 HORIZONTAL SOCKET | | | | |
| THIS DOCUMENT CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX INC. AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION | | | | | | | | | | |
| REV. | DESCRIPTION | | | | | WRITTEN BY: | | APPROVED BY: | DATE: YR/MO/DAY | |
| | DESIGN CONTROL | | STATUS | | | IC.YANG | | SH.CHU | 2020/09/02 | |
| DOCUMENT NUMBER | | | | | | | | | FILE NAME | SHEET |
| PS-2014581114-001 | | | | | | | | | PS-2014581114-001.doc | 1 OF 21 |

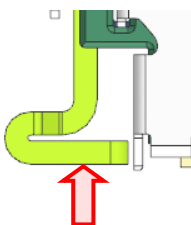
【4. PERFORMANCE】

4-1. Electrical Performance


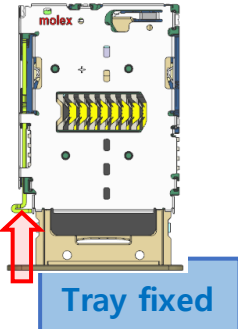
| Item | | Test Condition | Requirement | |
|-------|-----------------------|--------------------------------------------------------------------------------------------------|-------------------|-------------|
| 4-1-1 | Contact Resistance | Mate dummy card *, measure by dry circuit, 20mV MAX., 10mA MAX. (IEC 60512-2-1 / JIS C 5402 5.4) | mSD | 100 mΩ MAX. |
| | | | nSIM | 100 mΩ MAX. |
| | | | Detector ~ Switch | 200 mΩ MAX |
| 4-1-2 | Insulation Resistance | Apply 500V DC between adjacent pins or pin and ground. (MIL-STD-202, Method 302) | 1000 MΩ MIN. | |
| 4-1-3 | Dielectric Strength | Apply 500V AC for 1 minute between adjacent terminals and ground. (MIL-STD-202, Method 301) | No Breakdown | |

* The dummy card shows the card for the evaluation made of our company

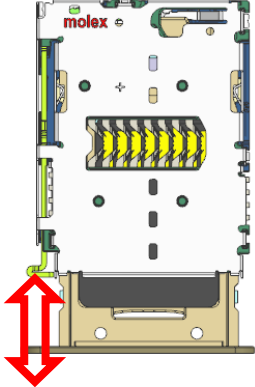
4-2. Mechanical Performance

| Item | | Test Condition | | Requirement |
|-------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------|
| 4-2-1 | Tray Insertion Force | Push the Tray at the speed rate of 25±3 mm / minute. (with actual cards) | Insertion force | 10 N MAX. {1.0 kgf MAX.} |
| 4-2-2 | Pin Ejection Force | Push the Eject-Bar using a pin.(25mm/min) with actual cards on a Tray. Measure the force at the 3rd. <div style="text-align: center;">  </div> | Push force | 4N ~13N {0.4Kgf ~ 1.3kgf} |

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|---------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------|------------------|
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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 2 OF 21 |

| | | | | |
|-------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------------------------------------|
| 4-2-3 | Push Strength | The Tray is inserted in positive direction and the load of 19.6 N {2 kgf} is added for 20 seconds at the speed rate of 25±3 mm / minute | Appearance | No mechanical damage |
| | | Force the entrance of socket in positive direction at the speed rate of 25±3 mm / minute | Peeling force From PCB | 100 N MIN. {10 kgf MIN.} |
| | |  | | |
| 4-2-4 | Contact Normal Force | <p>Measure contact normal force at the speed rate of 25±3 mm / minute.</p> <p>** The amount of deflection of the contact terminal should include the protrusion of the bead at the bottom of the Shell from the terminal contact point.</p> <p>** Thickness of cards are 0.67mm for nanoSIM card and 0.70mm for microSD card.</p> | microSD | Initial : 0.30N MIN./PIN {0.03kgf Min} |
| | | | nanoSIM | Initial : 0.35N MIN./PIN {0.035kgf Min} |
| 4-2-5 | Eject-Bar Strength | <p>Measure the strength at the speed rate of 25±3 mm / minute for 3 secs, at less than 1.60mm; the working distance of the Eject-bar.</p> <p>Apply force to the Eject-bar while holding the tray handle firmly</p> <p>. .</p> <p>** Cards are inserted</p> | Eject-Bar | 40N MIN {4 kgf MIN} |
| | | | Appearance | No remarkable damage on ejecting mechanism. |
| | |  | | |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 3 OF 21 |

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|-------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------|
| 4-2-6 | Contact Deformation | <p>Tray(with actual cards) insertion and removal up to 2,000 cycles.</p> <p>Measure contact height (from Housing top surface to contact top point) difference before and after test.</p> <p>Air blow Jig and Contacts (dry air) for 3 secs : at each 50 cycle interval.</p>  | Plastic deformation | MAX. Change From Initial contact height 20% MAX |
| | | ** Results may be obtained from the durability test item(4-3-1). | | |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 4 OF 21 |

4-3. Environmental Performance and Others

| Item | | Test Condition | Requirement | |
|-------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------|
| 4-3-1 | Durability (Life cycle) | <p>Before the full-scale test, the first 5 times insert / take out an empty tray(without any cards) by hand using the tray handle portion directly.</p> <p>Insertion and extraction are repeated 6 ~ 2,000 cycles with test PCB dummy card by Eject-Pin mechanism.</p> <p>After 2,000 cycles, clean a tray hook, air blow card & socket (dry air) for 10 secs.</p> <p>When measuring at the 2,000 cycles, it need to change to a new Tray. This is to avoid deformation of the Tray itself. And Air blow Socket (dry air) for 10 secs.</p> <p>* Thickness of all test PCB dummy cards are 0.57~0.64mm.</p> <p>* Test speed rate: 20~40/min.</p> | Contact Resistance | <p>MAX. Change From Initial contact resistance 40mΩ MAX. after 2,000cycles.</p> |
| | | | Pin Ejection Force | <p>4N ~13N {0.4Kgf ~ 1.3kgf} after 2,000cycles</p> |
| | | | Appearance | <p>No remarkable damage on ejecting mechanism.</p> |
| 4-3-2 | Temperature Rise | Carrying rated current load (UL 498 / IEC 60512-5-1) | | 30 °C MAX. |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 5 OF 21 |



PRODUCT SPECIFICATION

| | | | | |
|-------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------|
| 4-3-3 | Vibration | <p>Mate dummy card and subject to the following vibration conditions, for a period of 2 hours in each of 3 mutually perpendicular axes, passing DC 1 mA during the test.</p> <p>Amplitude: 1.52 mm P-P Frequency: 10-55-10 Hz Shall be traversed in 1 minute. (MIL STD-202, Method 201)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| | | | Discontinuity | 1.0 micro sec. MAX. |
| 4-3-4 | Shock | <p>Mate dummy card and subject to the following shock conditions. 3 shocks shall be applied along 3 mutually perpendicular axes(+/- X, Y, Z), passing DC 1mA current during the test. (Total of 18 Shocks)</p> <p>Test pulse: Half Sine Peak value: 50G(490m/s²) Duration: 11 ms (MIL-STD-202 Method 213)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| | | | Discontinuity | 1.0 microsec. MAX. |
| 4-3-5 | Moisture resistance | <p>Mate dummy card and exposed to 40±2°C, relative humidity 90~95% chamber for 96 hours. Upon completion of the exposure period, the test specimens shall be conditions at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (IEC-60512-11-3)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| | | | Dielectric Strength | Must meet 4-1-3 |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 6 OF 21 |



PRODUCT SPECIFICATION

| | | | | |
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| | | | Insulation Resistance | 100 MΩ MIN. |
| 4-3-6 | Temperature cycling | <p>Mate dummy card and subject to the following conditions for 5 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed.</p> <p>1 cycle</p> <p>a) $-40 \pm 3^{\circ}\text{C}$. . . 2 hours</p> <p>b) $+85 \pm 2^{\circ}\text{C}$. . . 2 hours</p> <p>Transit time shall be within 3 minutes. (EIA-364-32C / IEC 60512-11-4)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| 4-3-7 | Heat Resistance | <p>Mate dummy card and exposed to $85 \pm 2^{\circ}\text{C}$ for 96 hours.</p> <p>Upon completion of the exposure period, the test specimens shall be conditions at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (MIL-STD-202 Method 108)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| 4-3-8 | Cold Resistance | <p>Mate dummy card and exposed to $-40 \pm 3^{\circ}\text{C}$ for 96 hours.</p> <p>Upon completion of the exposure period, the test specimens shall be conditions at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed. (IEC 60512-11-10)</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 7 OF 21 |



PRODUCT SPECIFICATION

| Item | | Test Condition | Requirement | |
|--------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------------------------------------------------------------------|
| 4-3-9 | SO ₂ Gas | Mate dummy card and expose to 50 ± 5 ppm SO ₂ gas, ambient temperature $40 \pm 2^\circ\text{C}$, relative humidity 75% for 24 hours. ** Dummy card must be assured same test separately, otherwise use the new dummy card to measure the change of contact resistance. | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| 4-3-10 | Salt Spray | Mate dummy card and exposed to the following salt mist conditions. Upon completion of the exposure period, salt deposits shall be removed by a gentle wash or dip in running water, and air blow(dry air) for 3 seconds. The test specimens shall be dry for 1 to 2 hours at ambient room temperature after which the specified measurements shall be performed. <ul style="list-style-type: none"> ● NaCl solution concentration: $5 \pm 1\%$ ● Spray time(continuously): 48 hours ● Temperature : $35 \pm 1^\circ\text{C}$ ** Dummy card must be assured same test separately, otherwise use the new dummy card to measure the change of contact resistance. | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| | | | Insulation Resistance | 100 MΩ MIN. |
| 4-3-11 | Solderability | Dip solder tails into the molten solder (held at $245 \pm 5^\circ\text{C}$) up to 0.5mm from the tip of tails for 3 ± 0.5 sec. (JIS C60068-2-20 4.6) | Solder Wetting | 90% of immersed area must show no voids, Pinholes |

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 8 OF 21 |



PRODUCT SPECIFICATION

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| 4-3-12 | Thermal shock | <p>Mate dummy card and subject to the following conditions for 96 cycles. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed.</p> <p>1 cycle</p> <p>a) $-40\pm 3^{\circ}\text{C}$. . . 30 minutes</p> <p>b) $+85\pm 2^{\circ}\text{C}$. . . 30 minutes</p> <p>Transit time shall be within 5 minutes.</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | MAX. Change From Initial contact resistance 40mΩ MAX. |
| | | | Insulation Resistance | 100 MΩ MIN. |
| 4-3-13 | Temperature and Humidity | <p>Mate dummy card and expose to ambient temperature $85\pm 2^{\circ}\text{C}$, relative humidity 85% for 120 hours. The test specimens shall be conditioned at ambient room conditions for 1 to 2 hours</p> <p>** Dummy card must be assured same test separately, otherwise use the new dummy card to measure the change of contact resistance.</p> | Appearance | Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |
| | | | Contact Resistance | Max. Change From Initial contact resistance 40mΩ MAX. |
| | | | Insulation Resistance | 100 MΩ MIN. |

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| A1 | SEE SHEET 1 | | |
| REV. | DESCRIPTION | | |
| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 9 OF 21 |

| Item | | Test Condition | Requirement |
|--------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 4-3-14 | Resistance to soldering heat | <p style="text-align: center;">TEMPERATURE CONDITION GRAPH (TEMPERATURE ON BOARD PATTERN SIDE)</p> <ul style="list-style-type: none"> ● Forced air convection/N₂ reflow condition, ● Recommended metal mask is thickness 0.1mm with aperture ratio 150% for better soldering. <p><When reflowing> Repeat 2 time at the condition of above paragraph</p> <p><Manual soldering> Solder temperature: 380°CMax. Immersion time: 5 sec. Max. However, excessive pressure shall not be applied to the terminal. Recommend the reflow soldering only, do not manual soldering as possible.</p> | Appearance Appearance, construction: No defect such as remarkable abrasion, breakage or crack on the component. |

** (): Reference Standard

[5. PRODUCT SHAPE, DIMENSIONS]

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 10 OF 21 |

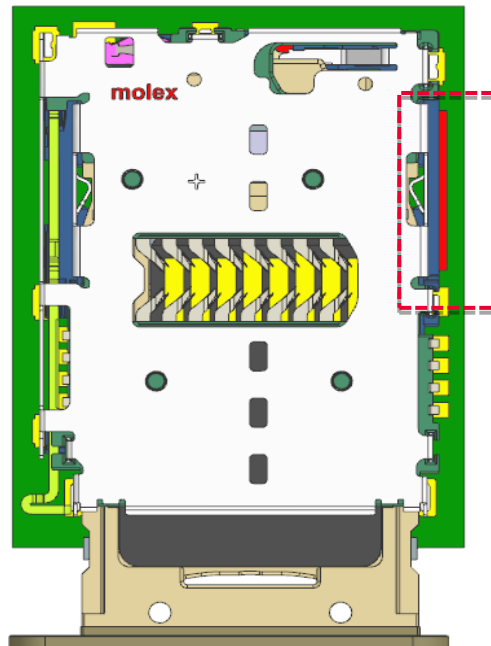


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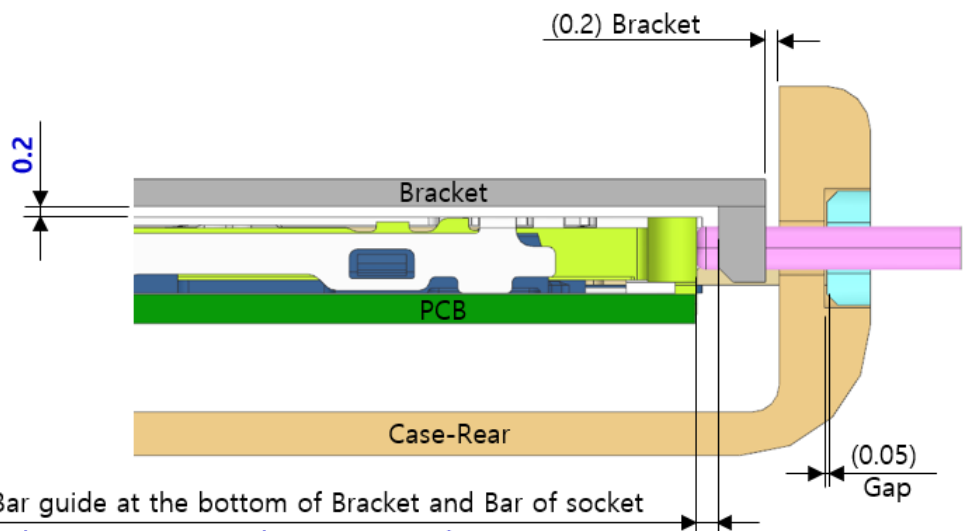
| Item | Test Method | Specifications |
|----------------------|-------------------|----------------------------------------------------------------------------|
| Appearance | Visual Inspection | No rust, contamination, Damage nor deformation Effecting on function |
| Appearance Dimension | | Refer to drawings. |

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| REV. | DESCRIPTION | | | |
| DOCUMENT NUMBER PS-2014581114-001 | | | FILE NAME PS-2014581114-001.doc | SHEET 11 OF 21 |

[6. RECOMMENDED DESIGN GUIDE FOR APPLICATION]



** For detail demension, please refer to 2D drawing.



0.5 Gap Between Bar guide at the bottom of Bracket and Bar of socket

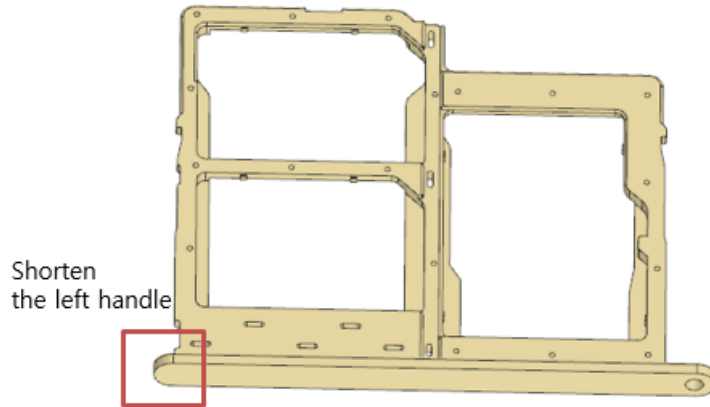
* This dimension 0.5 is in the tray inserted state.

[Reference figure]

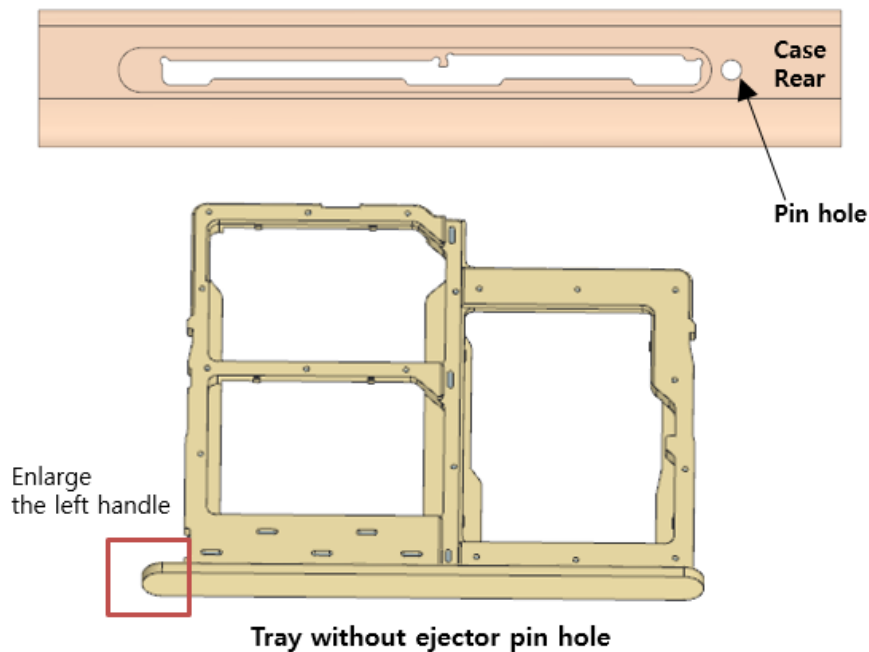
[Key points of Set Design Guide]

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 12 OF 21 |

6-1. To prevent from mis-insertion of a tray, design of tray handle should be easily distinguished.



If there is no ejector pin hole in the tray, It needs to do enlarge the left handle of the tray.

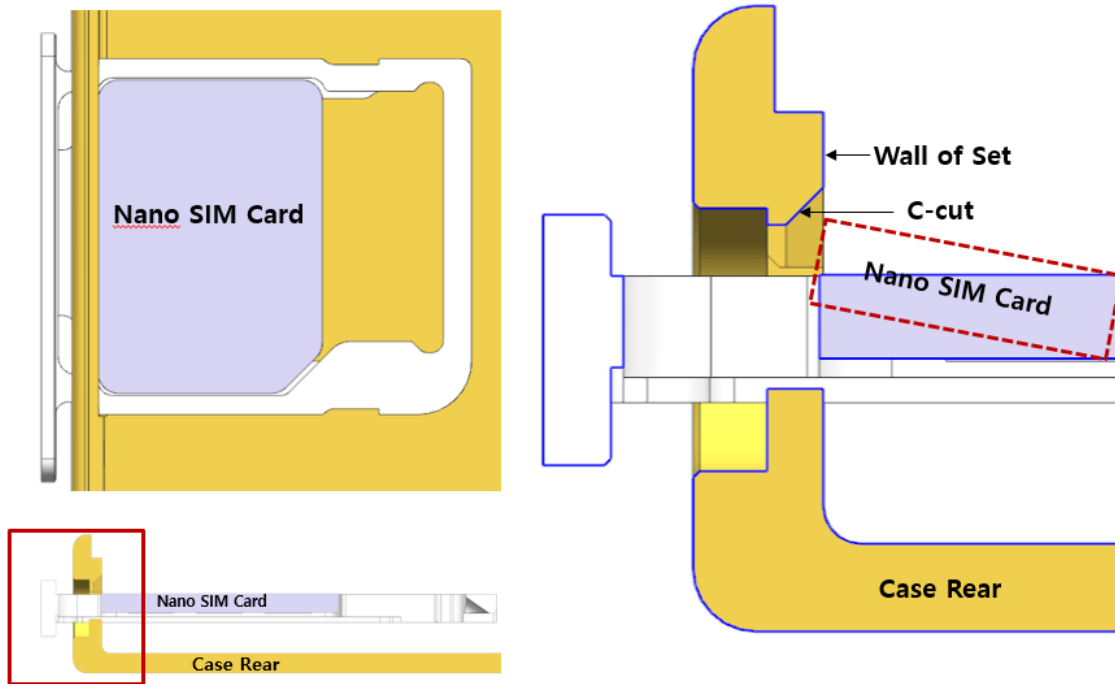


[Reference figure]

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 13 OF 21 |

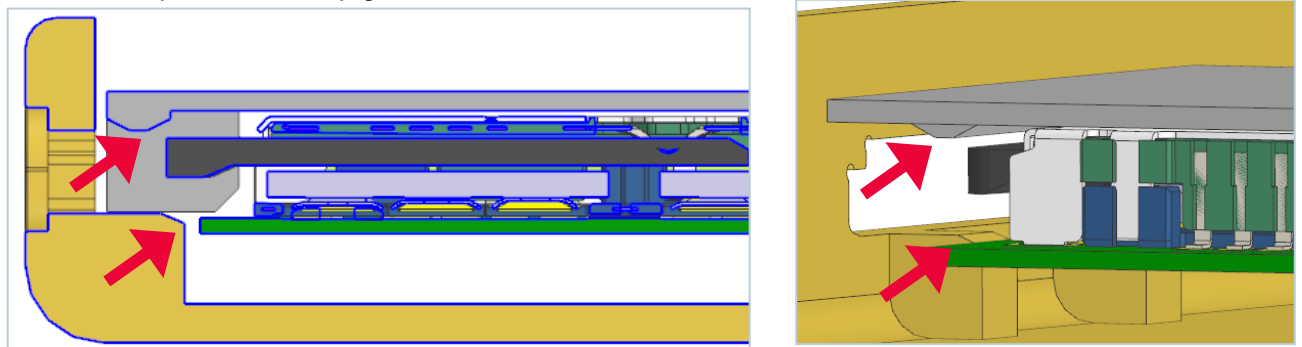
6-2. Card stuck prevention

To avoid the nanoSIM or microSD card stuck, pop-up to the inner entrance of set case, add the C-cut shape on the inner wall of set case.



[Reference figure]

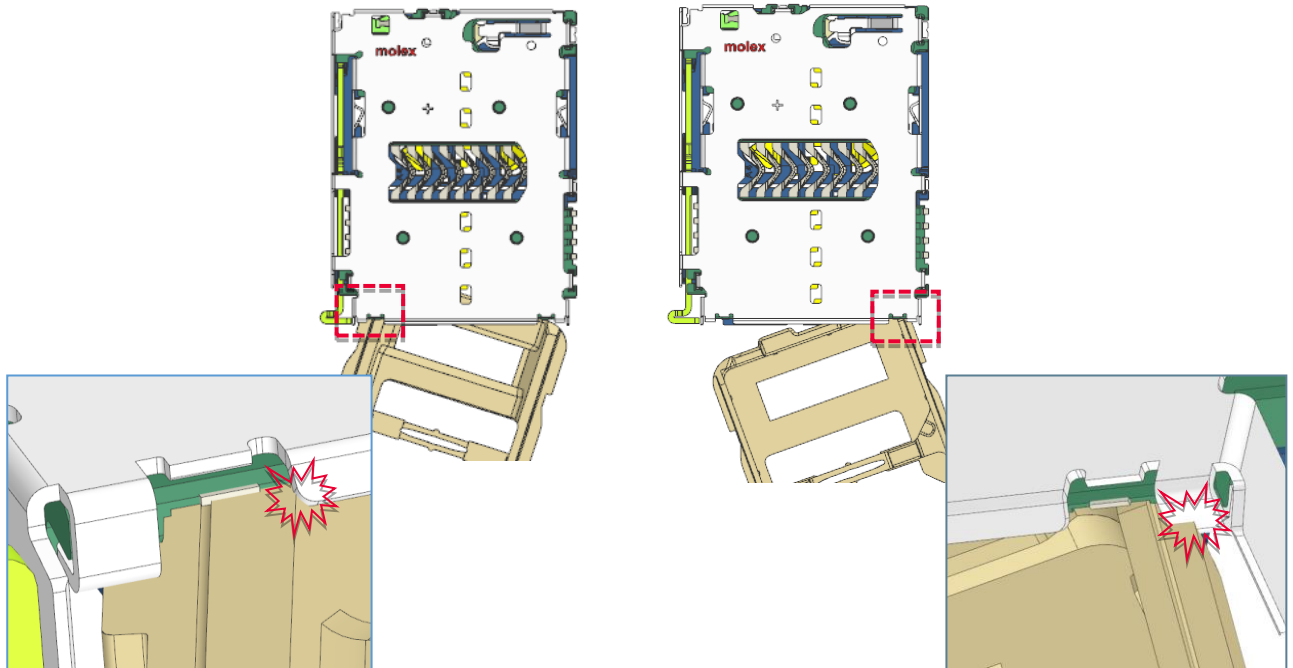
Another option is to set up guides above and below around entrance of a socket.



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|---------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------|-------------------|
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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 14 OF 21 |

6-3. Tray mis-insertion protection

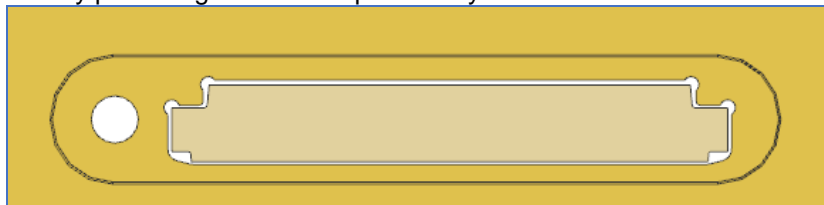
- This product prevents mis-insertion of the tray at the user's gentle force.



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II Inside

However, additional structure(block area) are needed because it is not perfect. Therefore, the tray polarizing should be operated by bracket and set case.



[Tray entrance at case rear with tray's section]

- Below figure is actual example of Tray polarization at case rear



[Referecne; existing mass production]

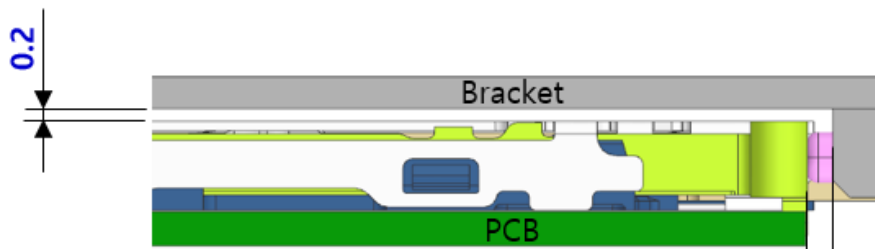
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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc |
| | | SHEET 15 OF 21 |

6-4. This product design was ensured microSIM max card insertion space
 - microSIM Card Spec. : 0.76 ± 0.08 , Socket card insertion space : 0.84
 This overlap is not problem to insert 0.84 Max card, because Shell top surface is flexible.
 This overlap and 0.84 Max card insertion were discussed with customer.

6-5. Tray Omission Prevention

6-5-1. Please make sure to design your phone case which push the tray head to maintain "Tray lock position" dimension on our drawing when inserting and ejecting the tray.

6-5-2. When this item is shocked and pressurized hard, there is possibility to occur deformity and tray sticking.
 Therefore, please make suitable gap on the top of MAX height of connector with shell warpage.
 If your phone design can't prevent from damaging socket, please confirm it.



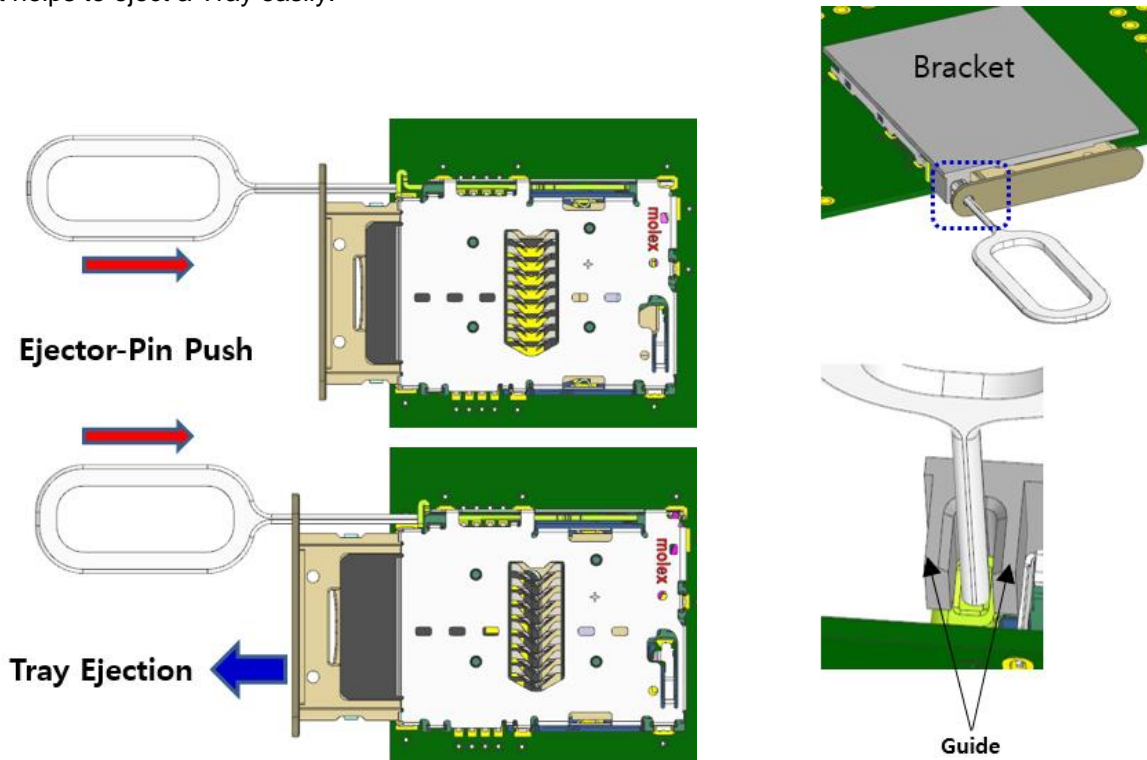
[Reference figure]

6-5-3. There is possibility to occur deformity, when the socket is over-shocked for a short time in direction of tray insertion and extraction.
 Please make sure design your phone case to be free from over-shock to connector.

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| DOCUMENT NUMBER PS-2014581114-001 | | | FILE NAME PS-2014581114-001.doc |
| | | | SHEET 16 OF 21 |

6-6. Tray Ejection

Please set up the guide surround of Ejector Pin.
And reduce the space between inner surface of set case and Eject-bar of socket,
it helps to eject a Tray easily.

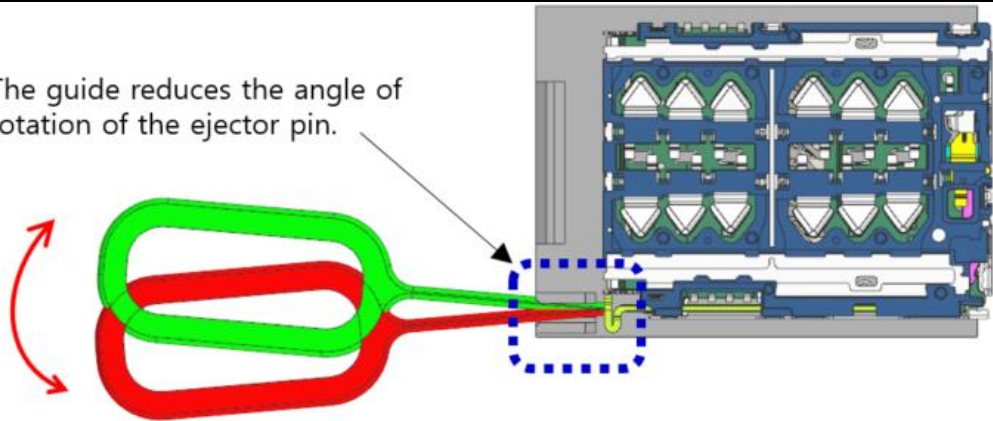


0.5 Gap Between Bar guide at the bottom of Bracket and Bar of socket

* This dimension 0.5 is in the tray inserted state.

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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc |
| | | SHEET 17 OF 21 |

The guide reduces the angle of rotation of the ejector pin.



6-7. If cards are placed upside down into the tray, then the socket is damaged.

So, need to mark(carving or print) the direction of a card on your phone case side for breakage prevention.

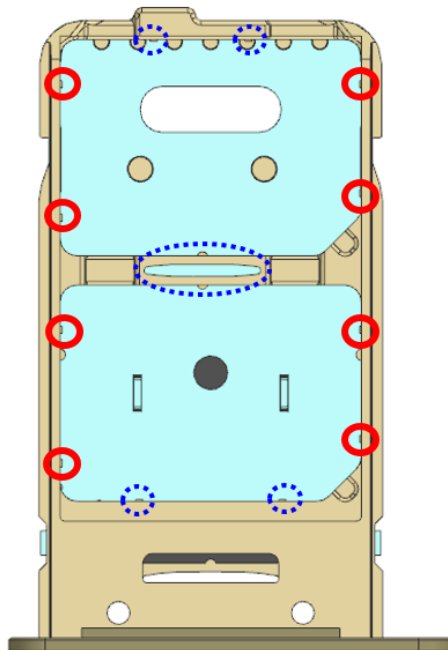
6-7-1. When a tray is inserted into a socket,

it is good to install a projection or tension bar on the tray to prevent the card from falling off the tray.

Especially in case of SIM card, it is recommended in the vertical direction.

Because, depending on the various size of the SIM card including cut by user, the tray retention force can be easily increased in the horizontal direction.

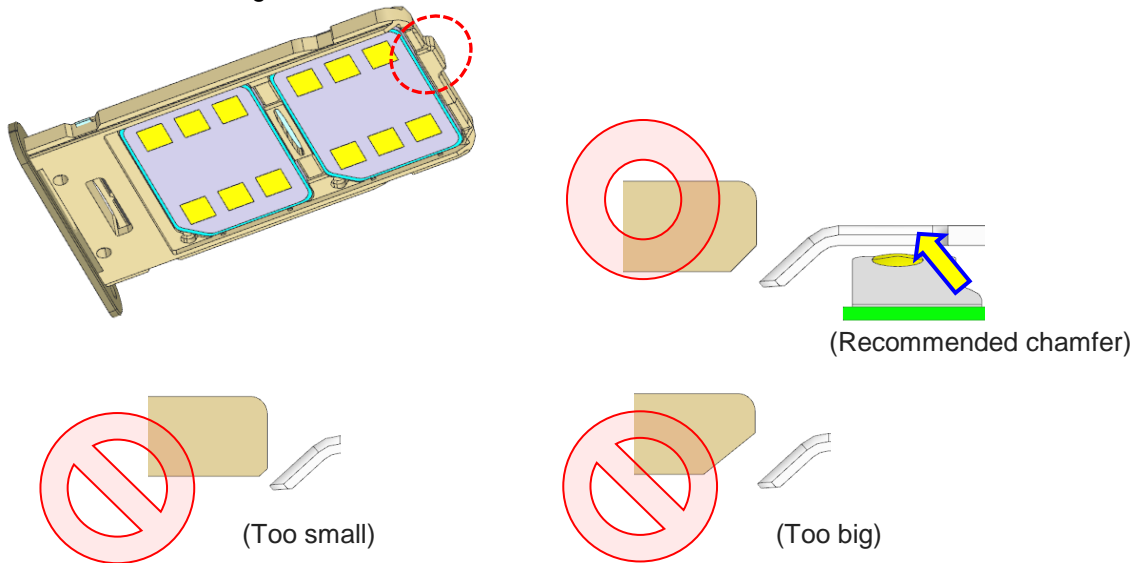
Therefore, attention should be paid to the size of the projection.



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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 18 OF 21 |

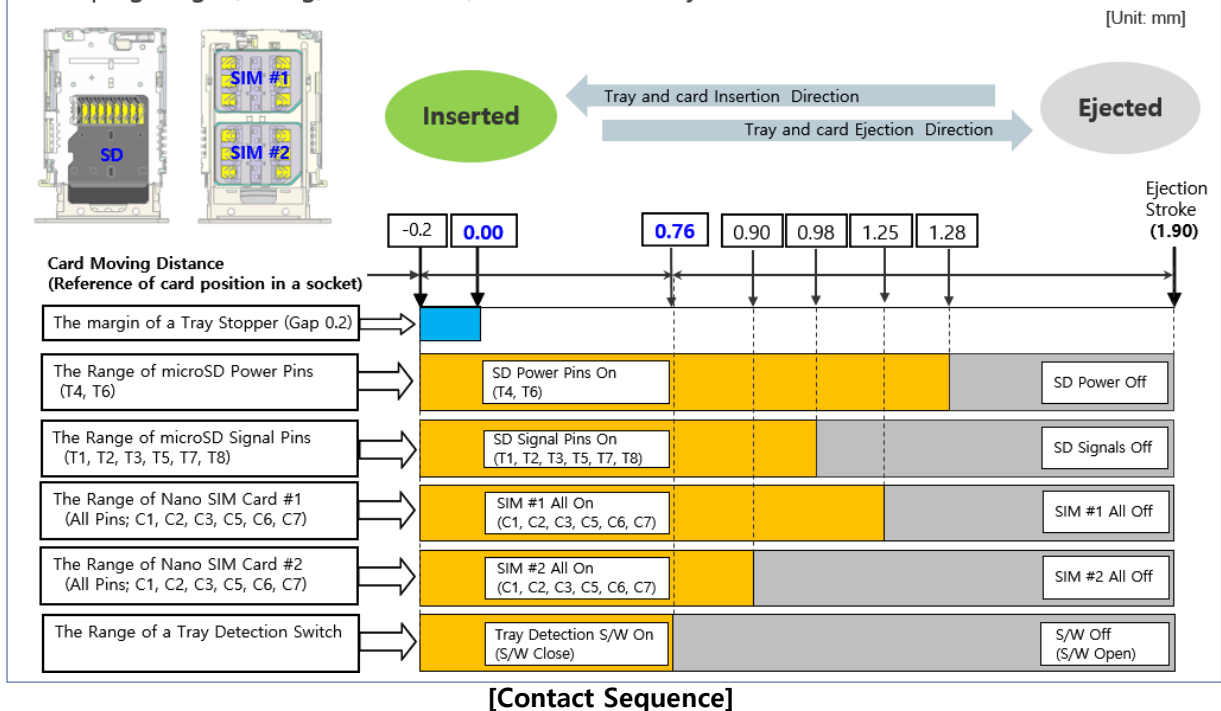
6-8. Caution for the Tray detection switch timing mechanism.

Do not apply the too big or too small chamfer bottom edge of a tray.
Refer to the drawing for details.



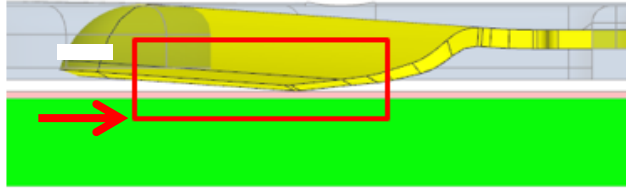
※ If the chamfer at edge of a tray and contact pad on SIM cards are small, the sequence of contacts may be reversed. So, software error may occur in the application(set).
In case of big chamfer, the tray dection switch timing become shorter.

Wiping length(timing) of microSD, nanoSIM and tray detection switch.



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|---------------------------------------------|-------------|----------------------------------------------------------|-------------------|
| REVISE ON PC ONLY | | TITLE: | |
| A1 | SEE SHEET 1 | PRODUCT SPECIFICATION FOR 3IN3 STACKED SOCKET | |
| REV. | DESCRIPTION | | |
| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 19 OF 21 |

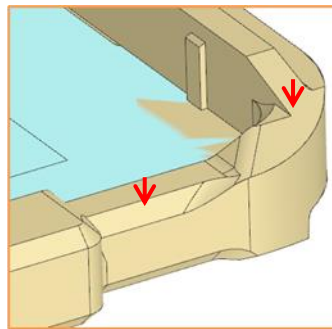
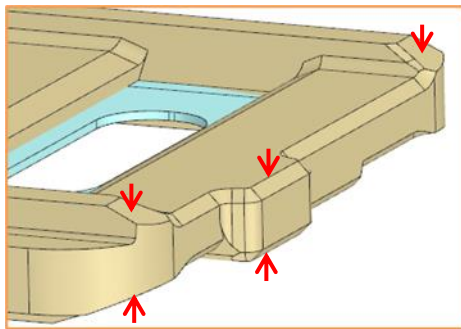
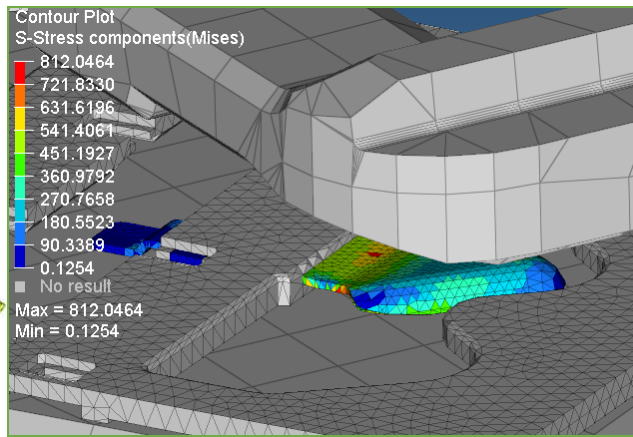
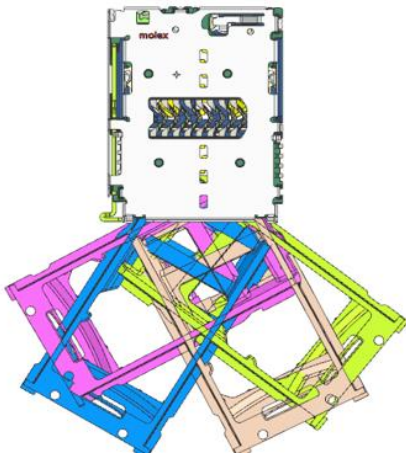
6-9 Please, Check the pattern prohibition(no via / no trace) on recommended PCB layout drawing.



[End tip of SIM Contact terminals just gentle touch on PCB]

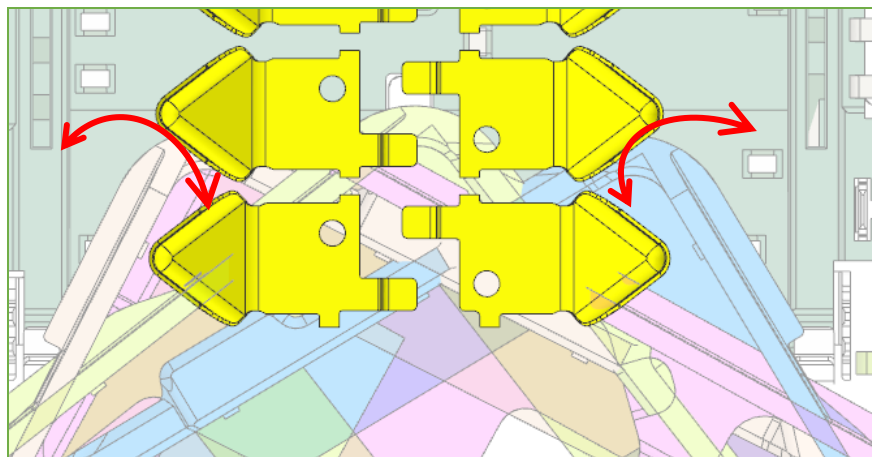
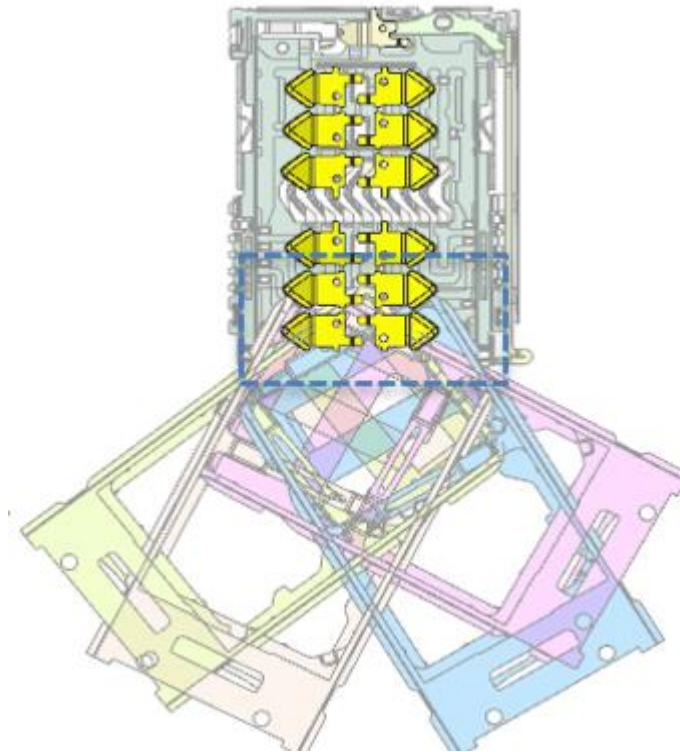
7.0 Etc.

This product has been considered for trays that are inserted from various angles. However, round or chamfer shape is essential for the head of the tray.



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| | SEE SHEET 1 | | |
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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 20 OF 21 |

If tray mis insertion in extreme case, it could be damaged at the Contact terminal as following.



[The weakest terminal damage according to the angle of the tray]

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|---------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------|-------------------|
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| DOCUMENT NUMBER PS-2014581114-001 | | FILE NAME PS-2014581114-001.doc | SHEET 21 OF 21 |