

# STK581U3C2DGEVB

## STK581U3C2D-E Evaluation Board User's Manual



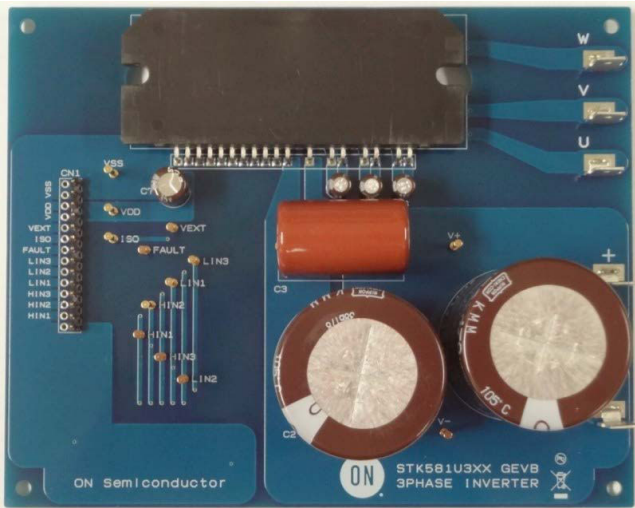
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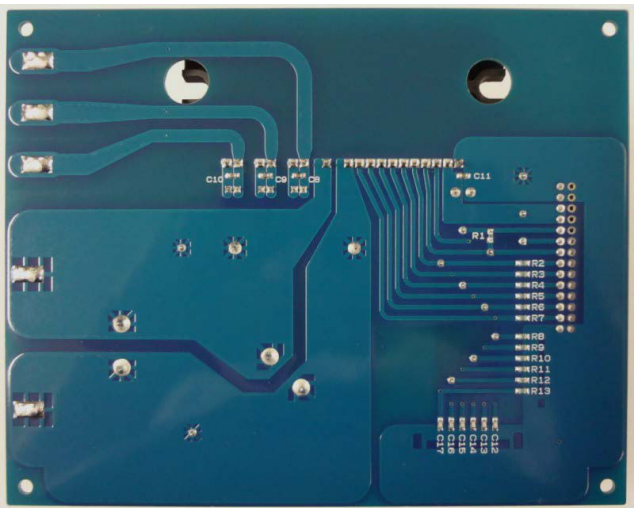
### Introduction

By using this board, STK581U3C2D-E (SIP3 / 1 shunt) can be evaluated.

### EVAL BOARD USER'S MANUAL



Surface



Back side

Figure 1. Evaluation Board Photos

Table 1.

| ONPN of Evaluation Board | ONPN of IPM   | Io   |
|--------------------------|---------------|------|
| STK581U3C2DGEVB          | STK581U3C2D-E | 30 A |

# STK581U3C2DGEVB

## CIRCUIT DIAGRAM

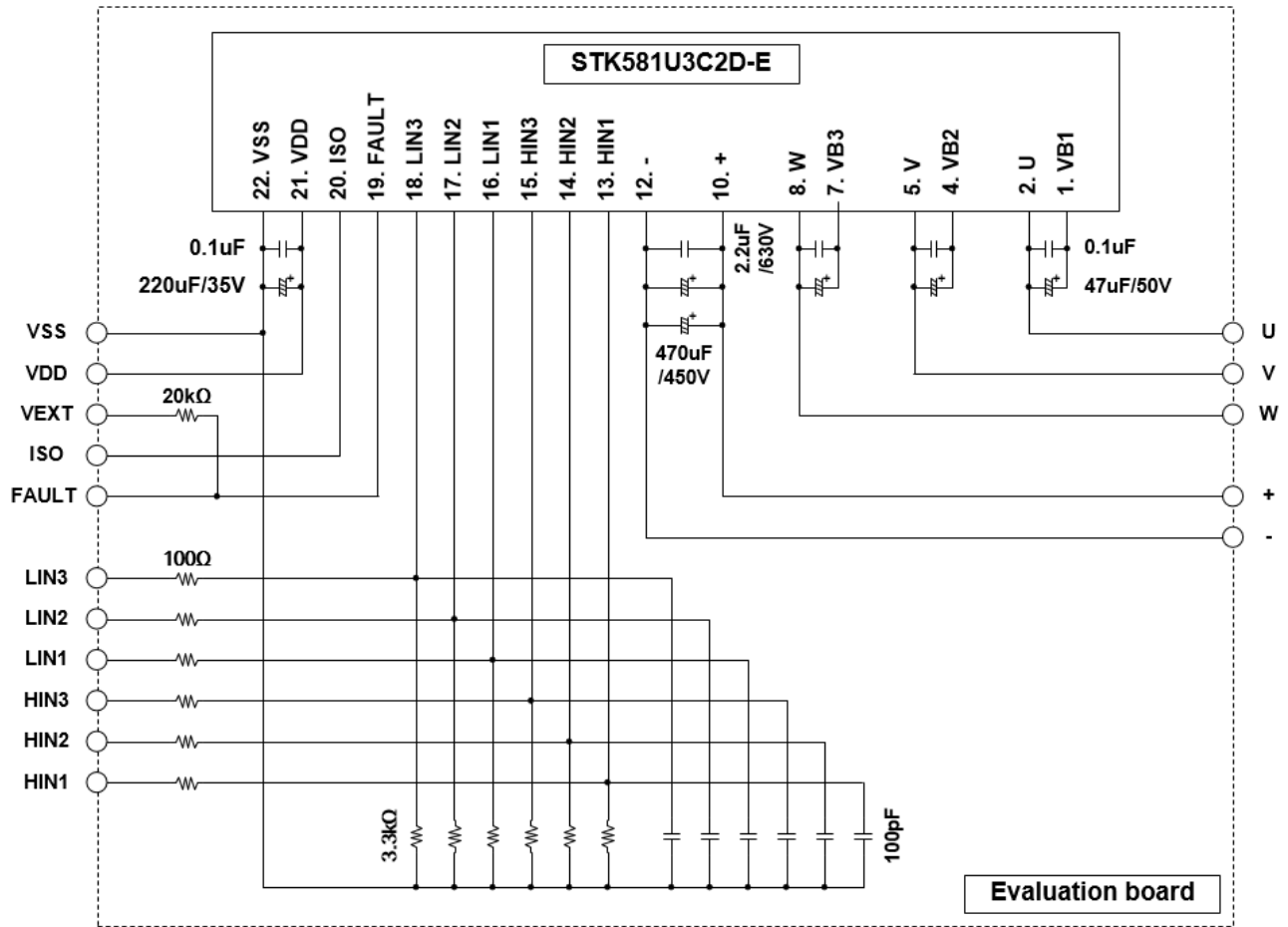


Figure 2. Circuit Diagram

PIN DESCRIPTION

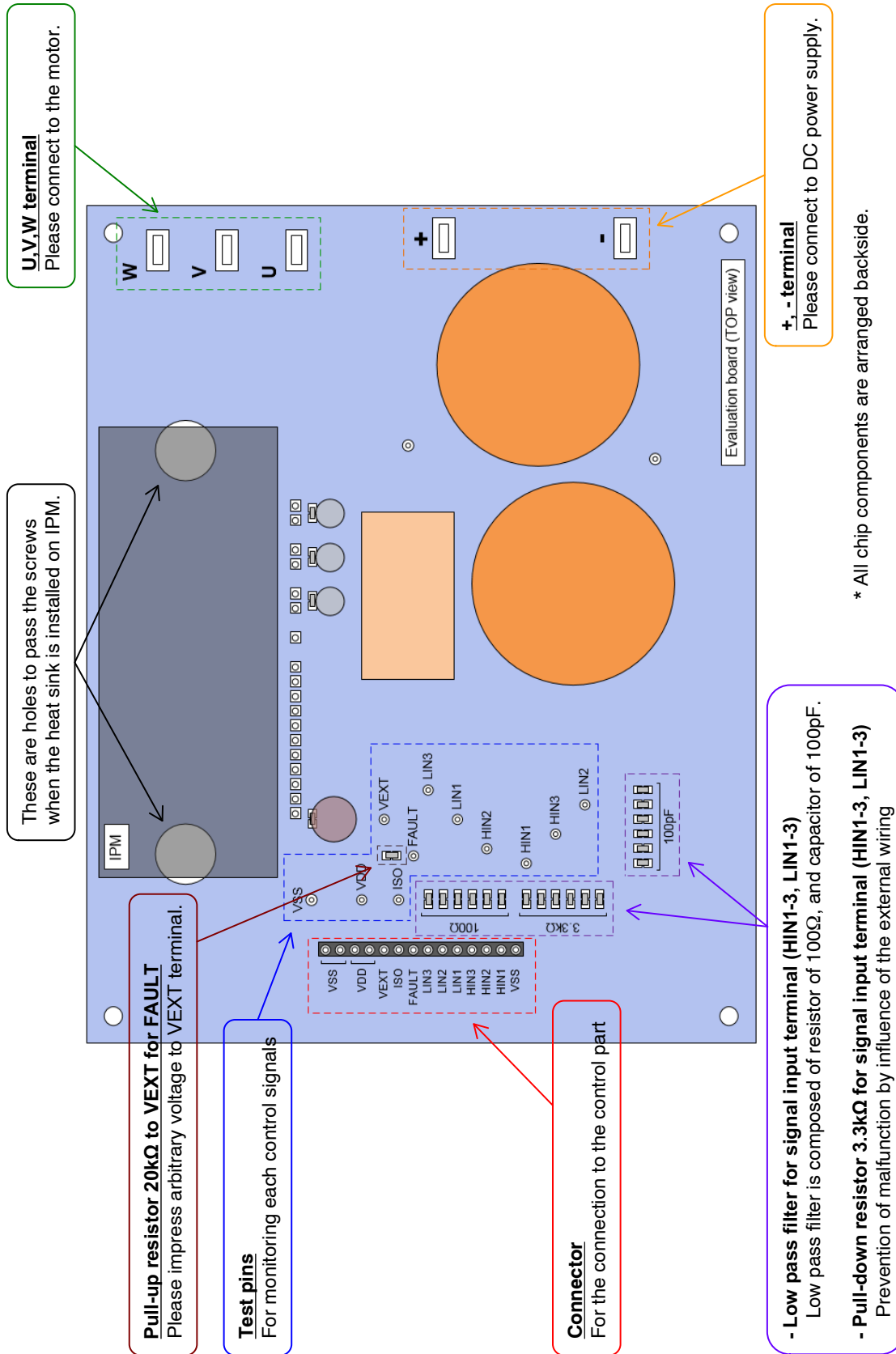


Figure 3. Description of Each Pin

# STK581U3C2DGEVB

## OPERATION PROCEDURE

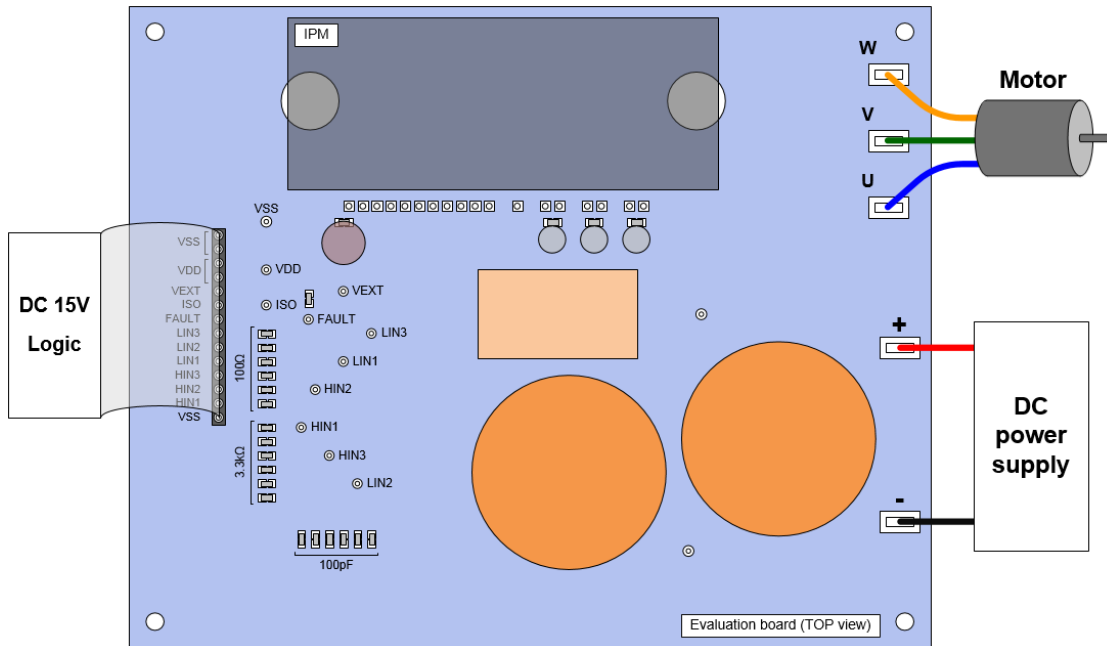


Figure 4.

**Step 1:** Please connect IPM, each power supply, logic parts, and the motor to the evaluation board, and confirm that each power supply is OFF at this time.

**Step 2:** Please impress the power supply of DC 15 V.

**Step 3:** Please perform a voltage setup according to specifications, and impress the power supply between the “+” and the “-” terminal.

**Step 4:** By inputting signal to the logic part, IPM control is started. (Therefore, please set electric charge to the boot-strap capacitor of upper side to turn on lower side IGBT before running.)

**NOTE:** When turning off the power supply part and the logic part, please carry out in the reverse order to above steps.

# STK581U3C2DGEVB

## LAYOUT

Length: 116 mm  
Side: 145 mm  
Thickness: 1.6 mm

Rigid double-sided substrate (Material: FR-4)  
Both sides resist coating  
Copper foil thickness: 70  $\mu\text{m}$

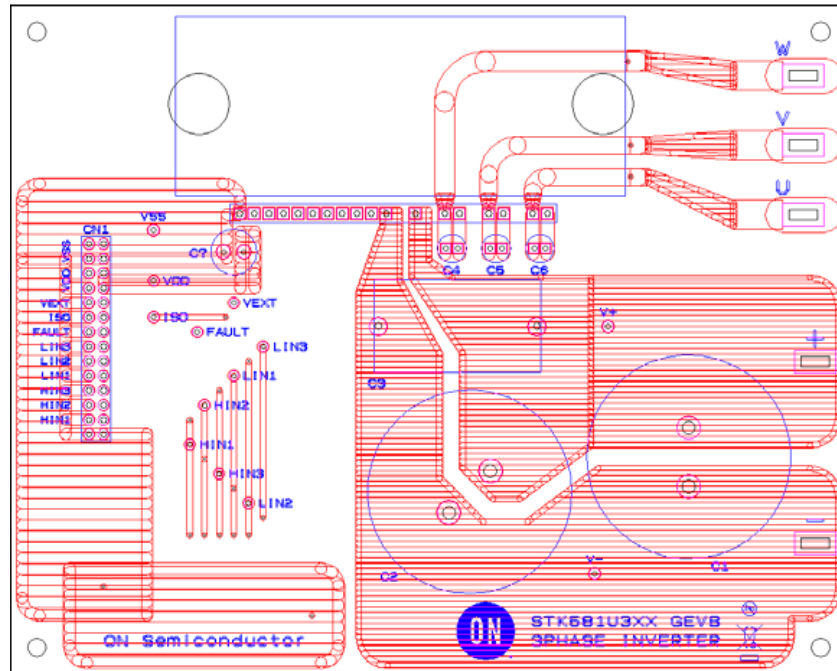


Figure 5. Layout (Top View) – Surface

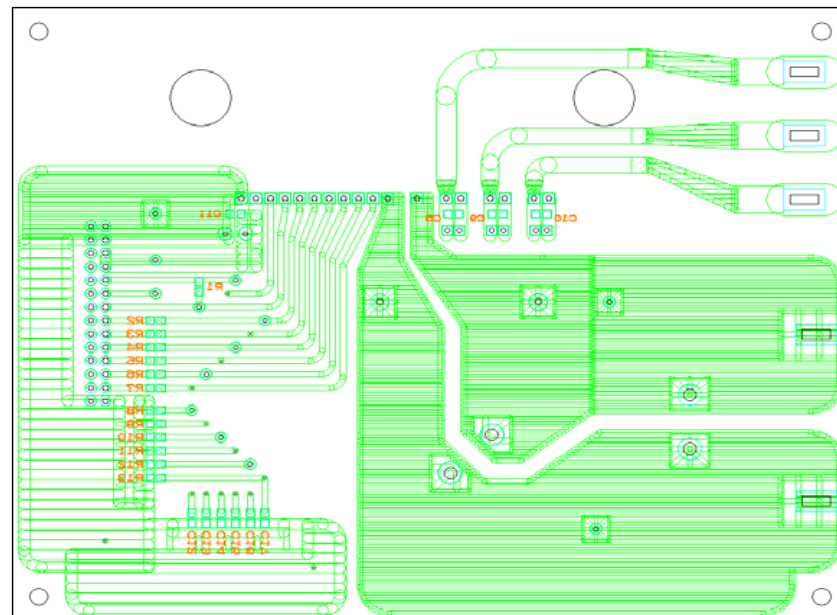


Figure 6. Layout (Top View) – Back Side

# STK581U3C2DGEVB

## BILL OF MATERIALS

**Table 2. EVALUATION BOARD BILL OF MATERIALS**

| Component-<br>s | Symbol                                             | SMD | DIP | Manufacturer     | Part Number         | Specification         | Supplement                      |                              |
|-----------------|----------------------------------------------------|-----|-----|------------------|---------------------|-----------------------|---------------------------------|------------------------------|
| Resistor        | R1                                                 | 1   |     | KOA              | RK73H1JTDD2002F     | 20 kΩ / 0.1 W / ±1%   | Chip (1608 size)                | Fault pull-up                |
|                 | R2 – R7                                            | 6   |     | KOA              | RK73H1JTDD1000F     | 100 Ω / 0.1 W / ±1%   | Chip (1608 size)                | Signal input low pass filter |
|                 | R8 – R13                                           | 6   |     | KOA              | RK73H1JTDD3301F     | 3.3 kΩ / 0.1 W / ±1%  | Chip (1608 size)                | Signal input pull-down       |
| Capacitor       | C1, C2                                             |     | 2   | Nippon Chemi-Con | EKMM451VSN471MA50S  | 470 μF / 450 V / ±20% | Aluminum electrolytic capacitor | Plus-Minus                   |
|                 | C3                                                 |     | 1   | PANASONIC        | ECQE6225JT          | 2.2 μF / 630 V / ±5%  | Film capacitor                  | Plus-Minus, Snubber          |
|                 | C4-C6                                              |     | 3   | Nippon Chemi-Con | EKMG350ELL470ME11D  | 47 μF / 35 V / ±20%   | Aluminum electrolytic capacitor | VBx – VSx                    |
|                 | C7                                                 |     | 1   | Nippon Chemi-Con | EKMG350ELL221MHB5D  | 220 μF / 35 V / ±20%  | Aluminum electrolytic capacitor | VDD-VSS                      |
|                 | C8 – C11                                           | 4   |     | MURATA           | GRM188B31H104K      | 0.1 μF / 50 V / ±10%  | Chip (1608 size)                | VBx – Vsx, VDD-VSS           |
|                 | C12 – C17                                          | 6   |     | MURATA           | GRM1882C1H101J      | 100 pF / 50 V / ±5%   | Chip (1608 size)                | Signal input low pass filter |
| Connector       | CN1                                                |     | 1   | HIROSE ELECTRIC  | A2-14PA-2.54DSA(71) | 14 pin / 2.54 pitch   |                                 |                              |
| Pin (S)         | VSS, VDD, VEXT, ISO, FAULT, HIN1-3, LIN1-3, V+, V- |     | 13  | Mac8             | ST-1-3              |                       |                                 |                              |
| Pin (L)         | U, V, W, +, -                                      |     | 5   |                  |                     |                       | Faston terminal (Tab)           |                              |
| IC              | IC1                                                |     | 1   | ON Semiconductor | STK581U3C2D-E       | SIP3 / 1shunt         |                                 |                              |
|                 | Total                                              | 23  | 27  |                  |                     |                       |                                 |                              |

### Heat Sink Mounting

NOTE: When mounting the heat sink on IPM, first, tighten the screws roughly by temporary maintaining the balance of left and right. Next, tighten both screws gradually alternately until the end.

Table 3.

| Item      | Recommended Condition                                                                                                                                                                        |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pitch     | 70.0 ± 0.1 mm (Please refer to Package Outline Diagram)                                                                                                                                      |
| Screw     | Diameter: M4<br>Bind machine screw, Truss machine screw, Pan machine screw                                                                                                                   |
| Washer    | Plane washer<br>The size is D = 9 mm, d = 4.2 mm and t = 0.8 mm (Figure 8) JIS B 1256                                                                                                        |
| Heat Sink | Material: copper or Aluminum<br>Warpage (the surface that contacts IPM):<br>-50 ~ 100 µm<br>Screw holes must be countersunk.<br>No contamination on the heat sink surface that contacts IPM. |
| Torque    | Final tightening: 0.79 ~ 1.17 Nm<br>Temporary tightening: 20 ~ 30% of final tightening                                                                                                       |
| Grease    | Silicon grease<br>Thickness: 100 ~ 200 µm<br>Uniformly apply silicon grease to whole back. (Figure 9)                                                                                        |

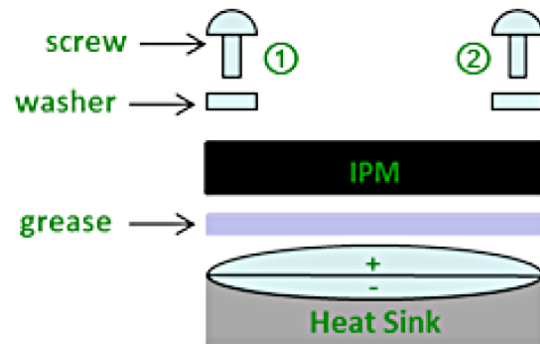


Figure 7. Mount HIC on a Heat Sink

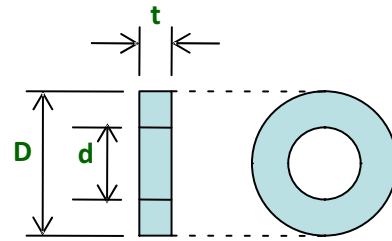


Figure 8. Size of Washer

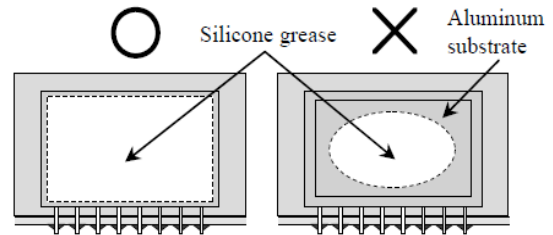


Figure 9. About Uniformly Application

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