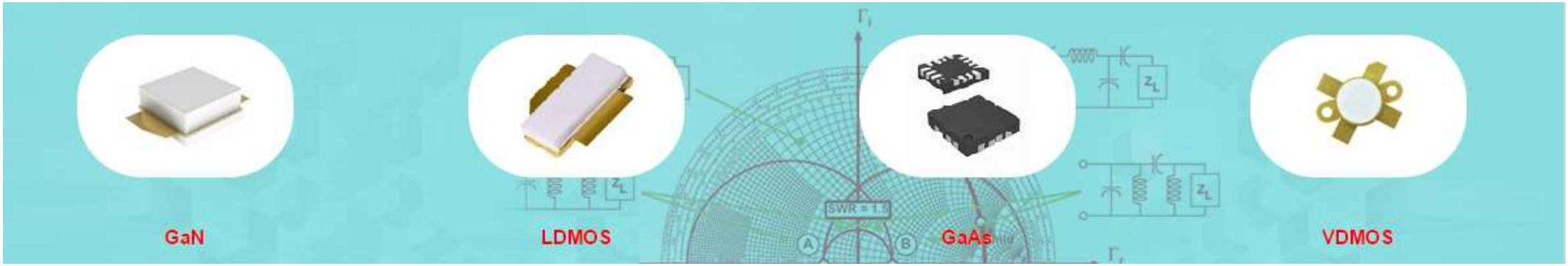
Assembly and Guidelines of Innogration iModule



Contents

General Description

Device Orientation Identification

Heatsink Design Guide

Attached on heatsink

A:attachment using screws;
B: attachment using solder.

DC and RF Connections

Appendix

General Description

- iModule is a product type with bare die and its matching circuit on flange to maximize the RF performance in compact size, it can be part of customer's circuit or sub-system. It has no direct connection pins, which needs addtional work

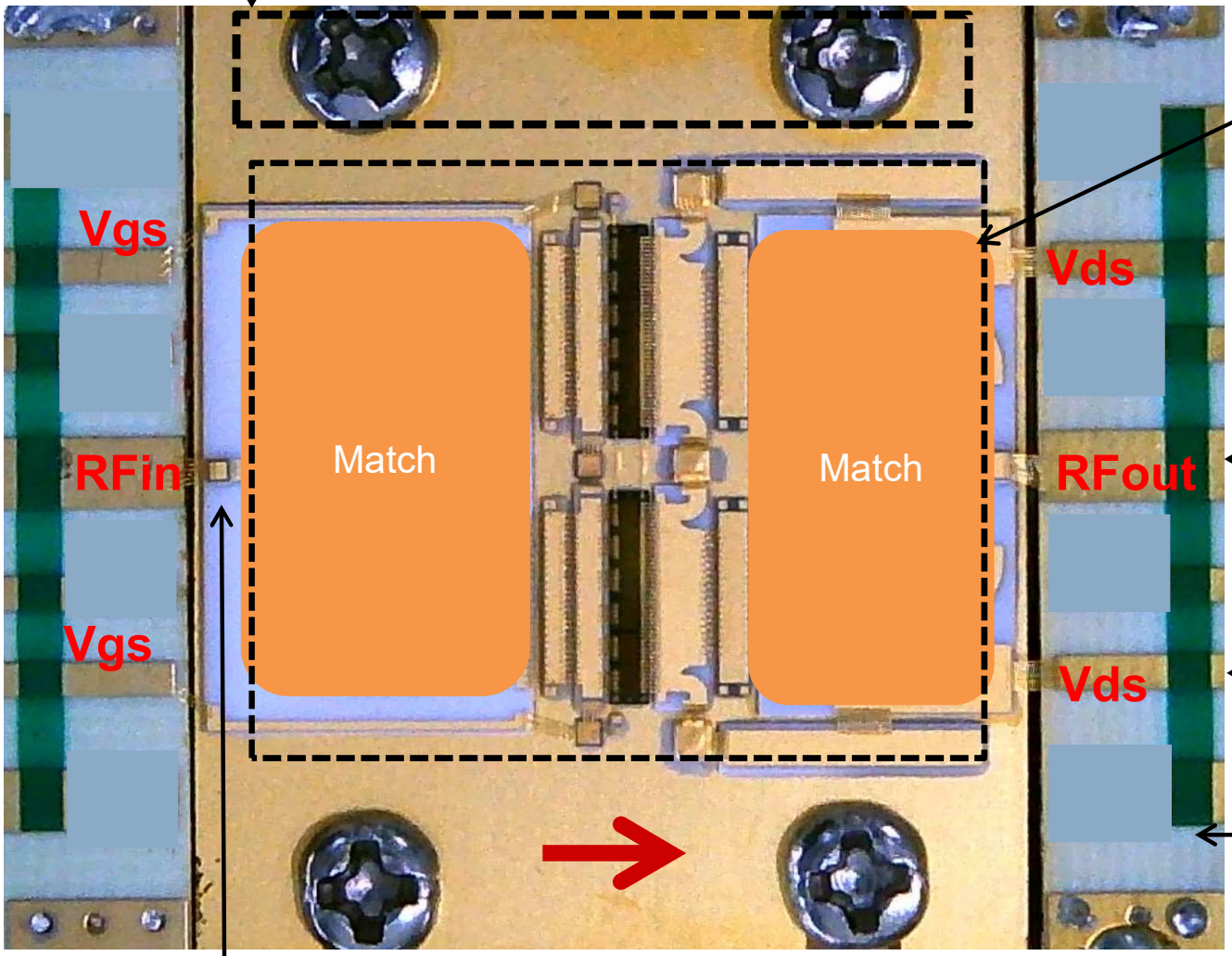
•This application note provides basic information on the use and handling of iModule such as GMAH2060-100F, to ensure proper DC/RF connections and achieve optimum performances.

- This guide is applicable to all iModule. Specific devices may have differences in RF, DC feeding connection, and assembly methods. Relevant information can be obtained from the component manual or by consulting our engineer.

Basic Parts of iModule

- **Flange**

The CPC flange ensures excellent heat dissipation and can be welded or crimped to the heat sink.



- **Device area**

The device area includes GaN/LDMOS chips, chip capacitors, and ceramic matching circuits, all connected to the flange.

- **RF Connection**

Wires bonding to 50 Ohm Microstrip Line.

- **DC Connection**

Wires bonding to DC Feeding Line.

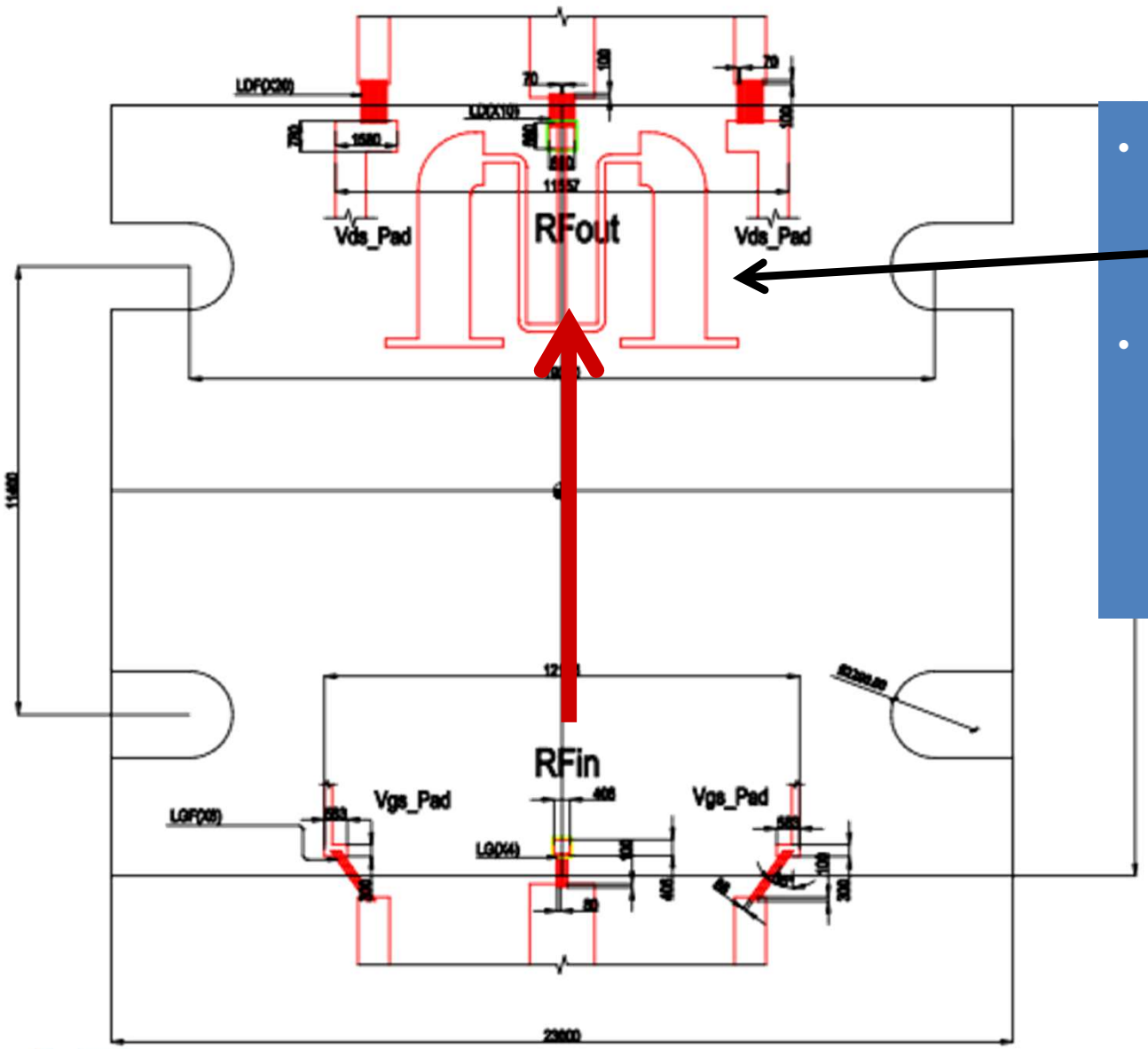
- **Solder Mask**

Prevent the solder flowing into the device.

- **DC blocking Capacitor**

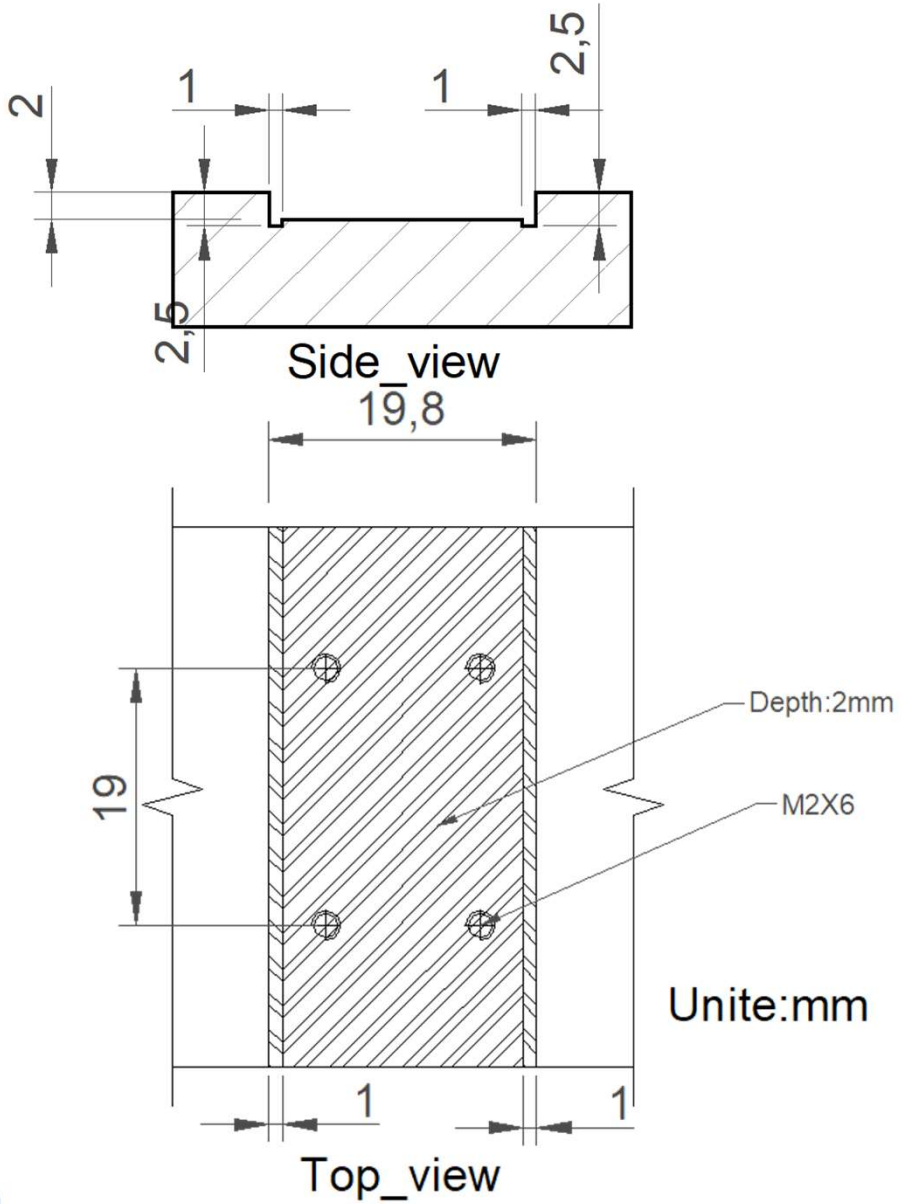
No external DC blocking capacitor required.

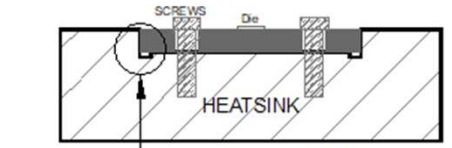
Device Orientation Identification



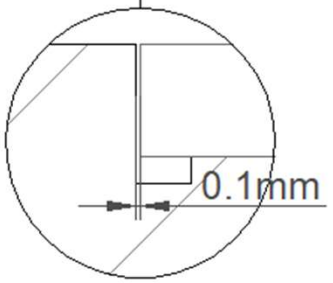
- Position the inputs and outputs based on the matching **feature shapes** in the figure on the left.
- Please contact the relevant engineer for identification and confirmation if the input and output shapes are similar and difficult to distinguish.

Heatsink Design Guide



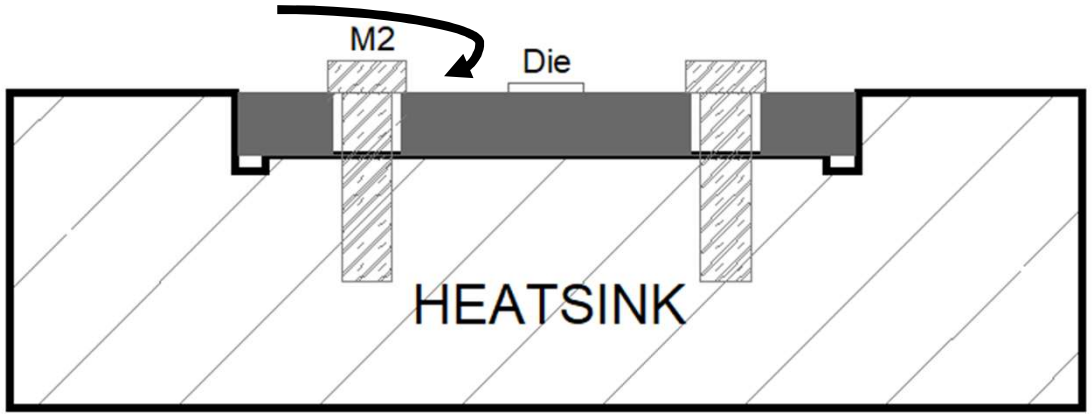


Cross-sectional View of IMFET Mounted on Heatsink.



A 0.1mm gap is necessary to accommodate flange width tolerance and thermal expansion due to temperature changes.

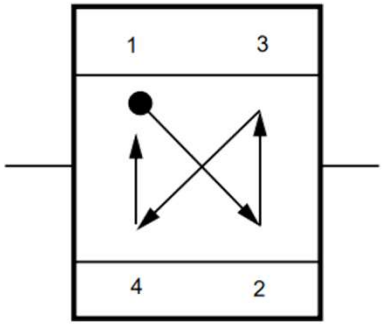
Attachment A: using screws



- Use M2 screws for fastening.
- Recommended Maximum Torque Values.

Screw	Torque Values
1.4 mm	2.25 kgf cm 0.22 Nm 31 oz in.
2.0 mm	2.75 kgf cm 0.27 Nm 38 oz in.
3.0 mm	5.50 kgf cm 0.54 Nm 76 oz in.
# 2	2.80 kgf cm 0.28 Nm 39 oz in.
# 4	5.40 kgf cm 0.50 Nm 73 oz in.

- iModule Tightening Sequence.



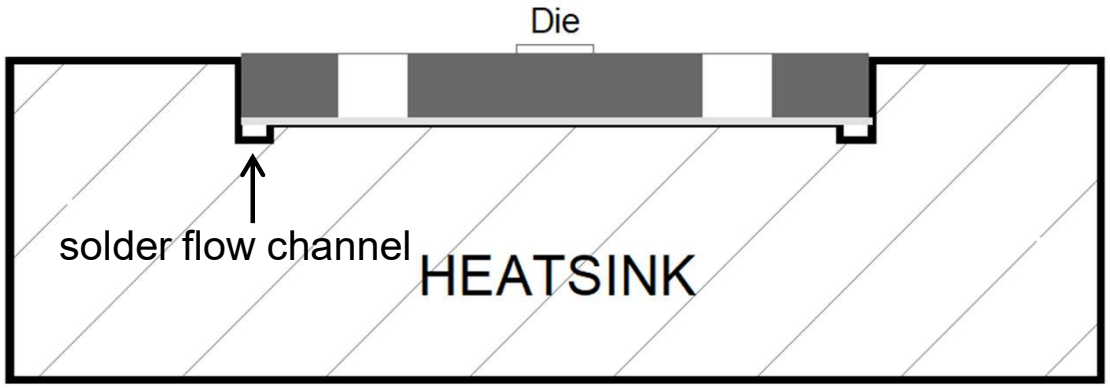
Apply a thin, even layer of thermal grease to the bottom of the flange.

Confirm the device orientation and align the holes.

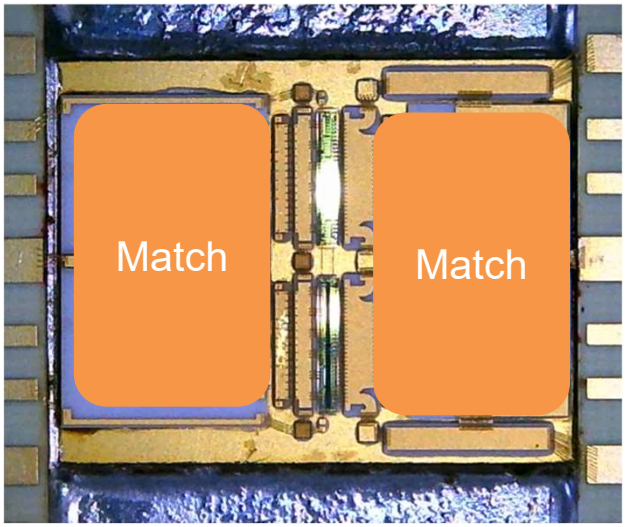
Tighten the device in sequence.

Check and ensure the device is flat and not warped.

Attachment B: using solder



- This method attaches the iModule flange to the heatsink with low-temperature Indium solder, using temperatures below 175°C.
- A solder flow channel is needed to prevent solder from flowing upwards.



Apply a thin, even layer of low-temperature solder paste or pre-coat solder on the bottom of the flange.

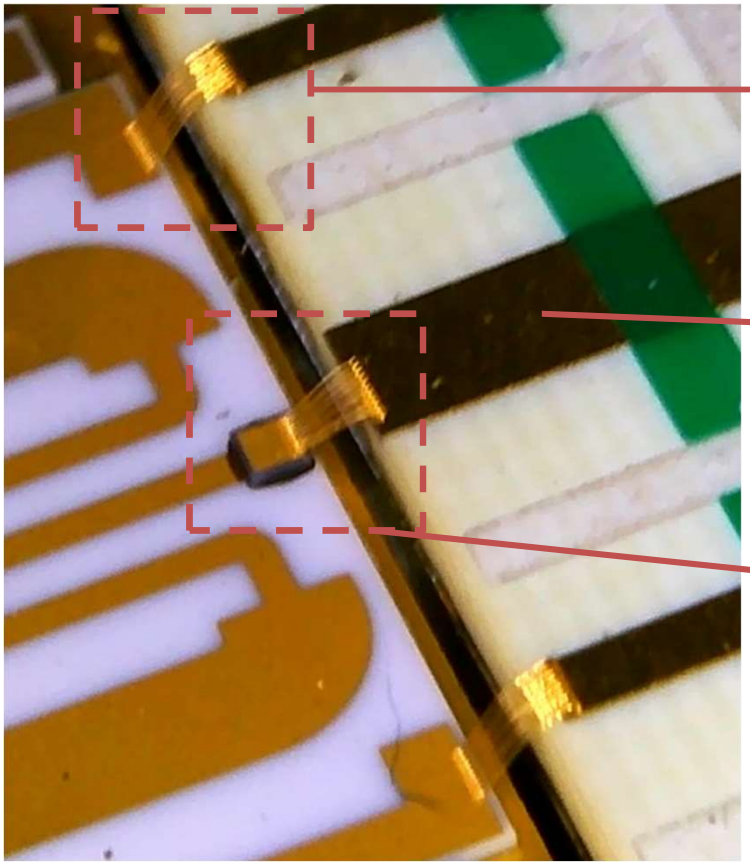
Confirm the device orientation and align it properly.

Solder on a hot plate and use tweezers for side alignment.

Check and ensure the device is soldered properly.

DC and RF Connections

- Use Au wires or ribbons for bonding to the PCB microstrip.
- Bonding wires can be 1.2mil, 1.5mil, or 2mil.
- Wire bonding details are in the appendix.

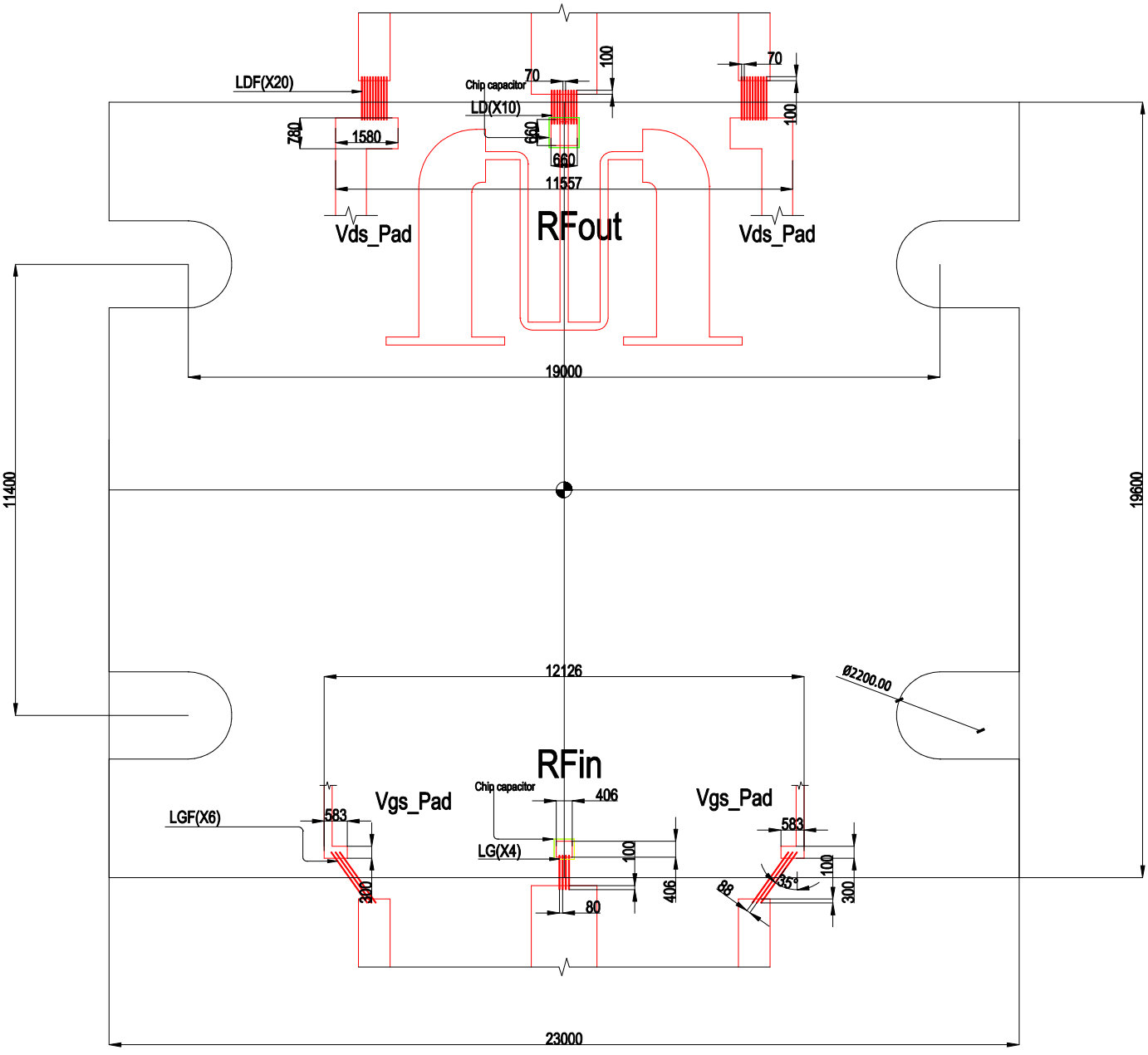


DC feeding wires：The quantity should not be less than the reference design in the appendix.

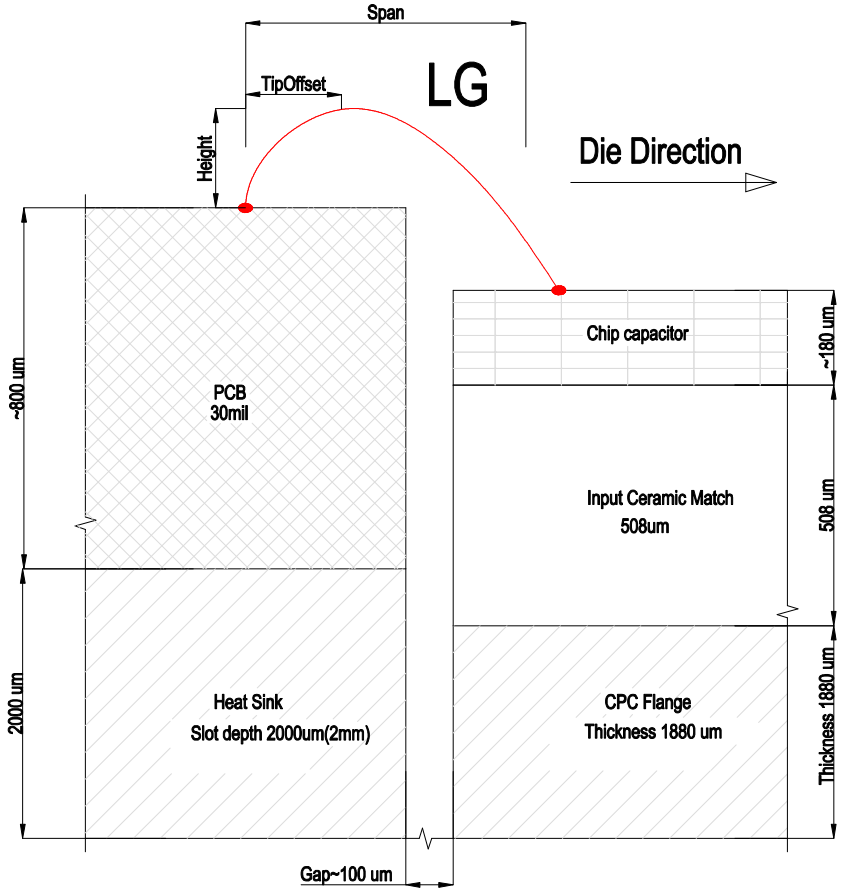
Microstrip：The RF connection microstrip should be 50 Ohm. Gold plating of 2μm is recommended to optimize bonding performance.

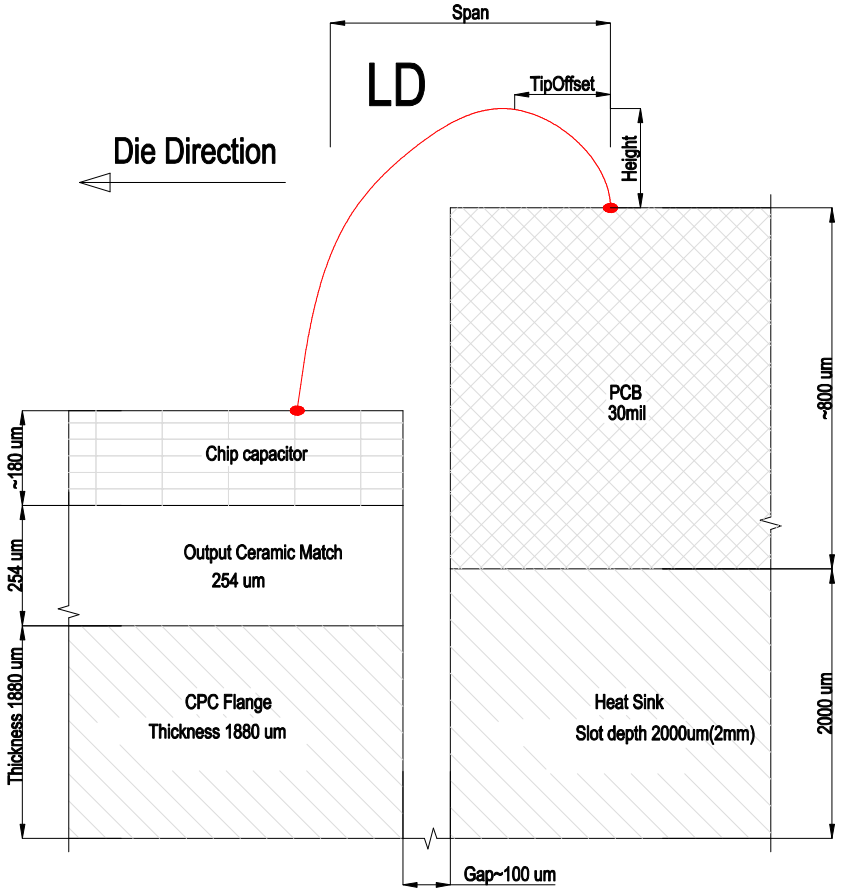
RF wires bonding：Please refer to the appendix. Its inductance affects device performance.

Note: If without micro-assembly conditions, other RF connection methods, such as copper strip connections, may impact performance and may require manual tuning for optimum performances.
DC connection method has much less sensitivity on the shape of wires



	GMAH2060-100F_Assembly_Guide_Appendix-1	
	Unit	um





Wire configuration					
Name	Span (um)	Height (um)	Tip offset (um)	Pitch (um)	Number
LG	868	70 to Lead	175	80	4
LD	851	80 to Lead	188	70	10
When using 1.5mil or 2mil gold wire, refer to LG 350pH or LD 285pH for replacements. Additionally, the total cross-sectional area of the LD gold wire should be no less than this reference design.					
LGF	More than 3 wires				
LDF	More than 10 wires				
Gold wire-Ball bonding Φ0.0012"			LG,LD ex(±25); LGF and LDF have no tolerance requirements.		

GMAH2060-100F_Assembly_Guide_Appendix-2	
Unit	um

Powering RF by Innovative Integration