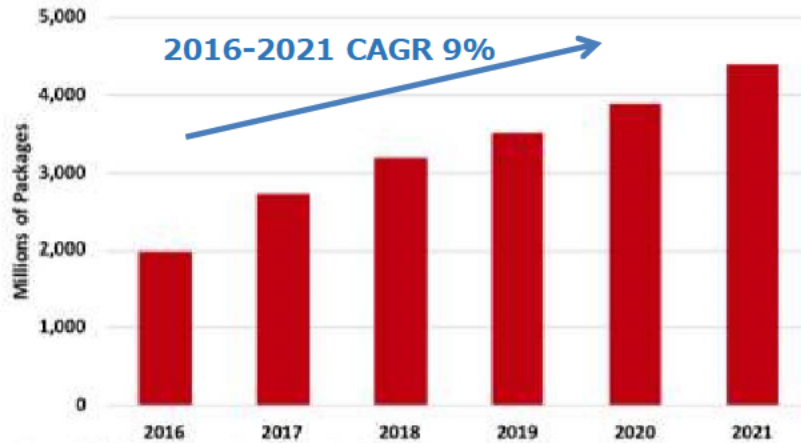


# Power QFN with Cu-Clip

# Power QFN with Cu-clip

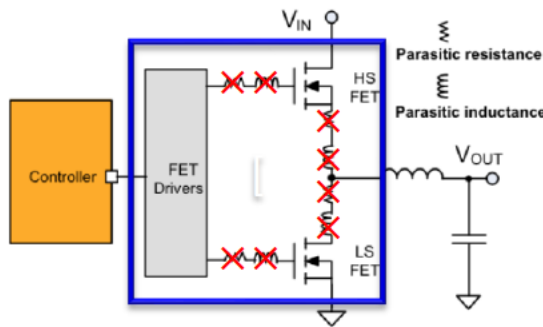
## Power QFN with Copper clip market



Source : TechSearch International Inc.

## Target applications ; High current DCDC converter

### Step down DC-DC converter



Required characteristics :  
Low Parasitic Inductance and Resistance

## Clip process flow image

Case study: For multi chips

### 1. Solder screen printing



### 2. Die attach



### 3. Solder dispense



### 4. Clip attach & Reflow

& Flux cleaning



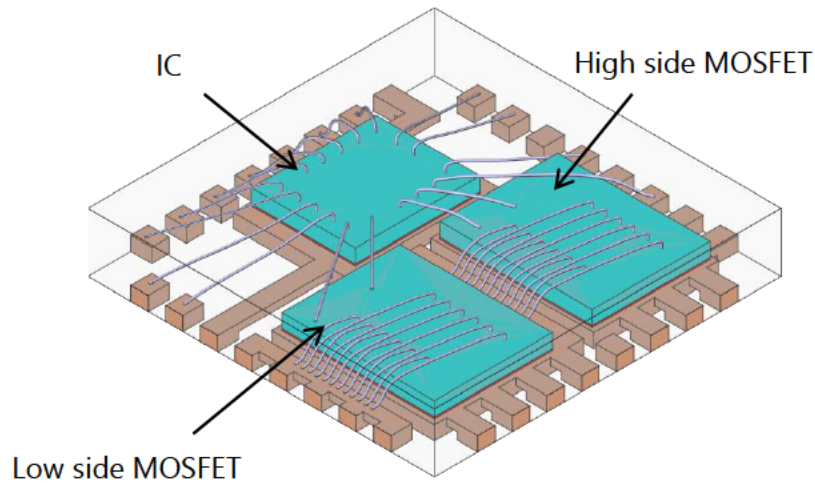
- Transfer Mold
- Post Mold Cure
- Laser Mark
- Package Sawing
- Test

# Power QFN with Cu-clip

## Specific study case

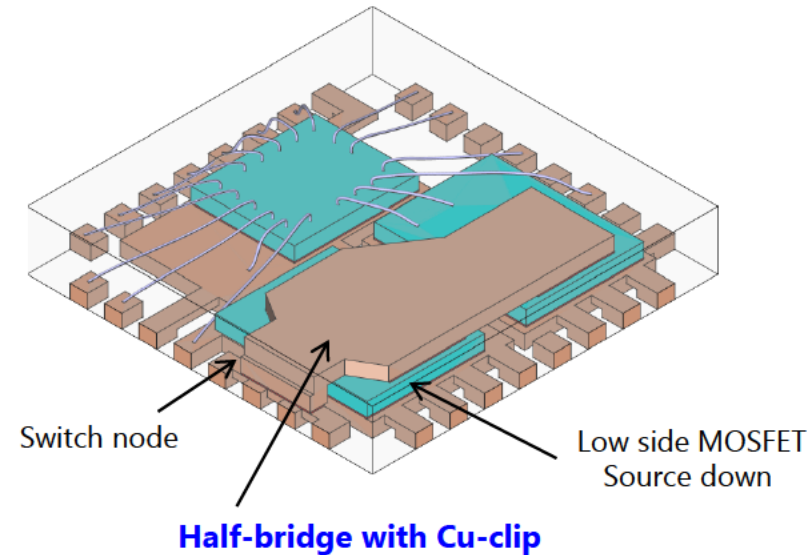
- Synchronous rectification type step-down DCDC
- PKG : Power QFN
- Chip : IC+MOSFET×2(Half-bridge) 3in1

### Current) Wire Type



- High side MOS ; Drain down
- Low side MOS ; Drain down
- Wire ; Pd-Cu  $\Phi 30\mu\text{m}$
- MOSFET source 12wires  
✳Staggered wiring

### Suggestion) Cu-Clip Type



- MOSFET Wire → Cu-clip(Half bridge)
- MOSFET Low side → Source down
- Switch node is small

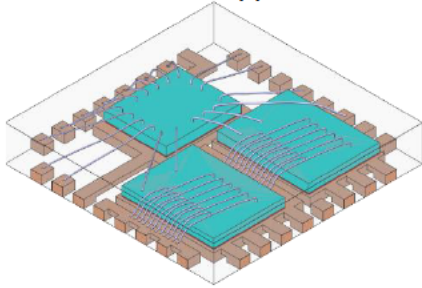
⇒ Low Inductance and Resistance

**Target application**  
**Current : 10~30A**

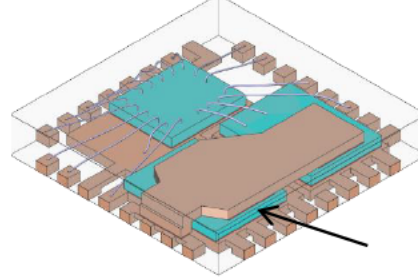
# Power QFN with Cu-clip

## Advantage : Low Electrical Parasitic properties

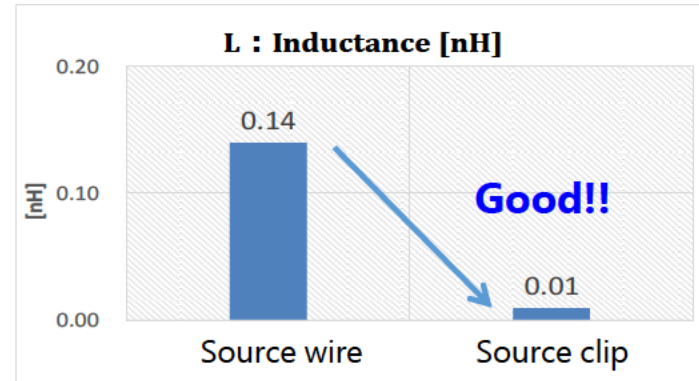
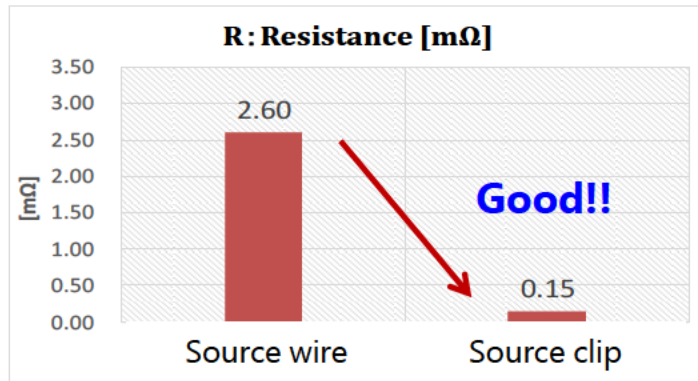
Source Wire type



Source Clip type



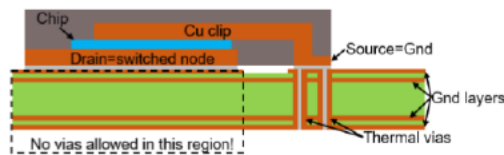
Source down



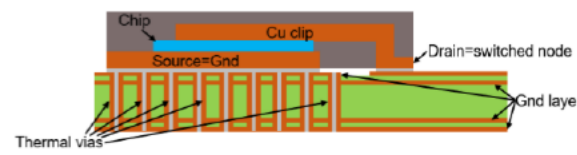
## Source down advantage

Mount the source electrode that becomes the GND potential directly on a large-area substrate.  
 Low characteristic loss: heat dissipation and resistance

Normal) Drain down



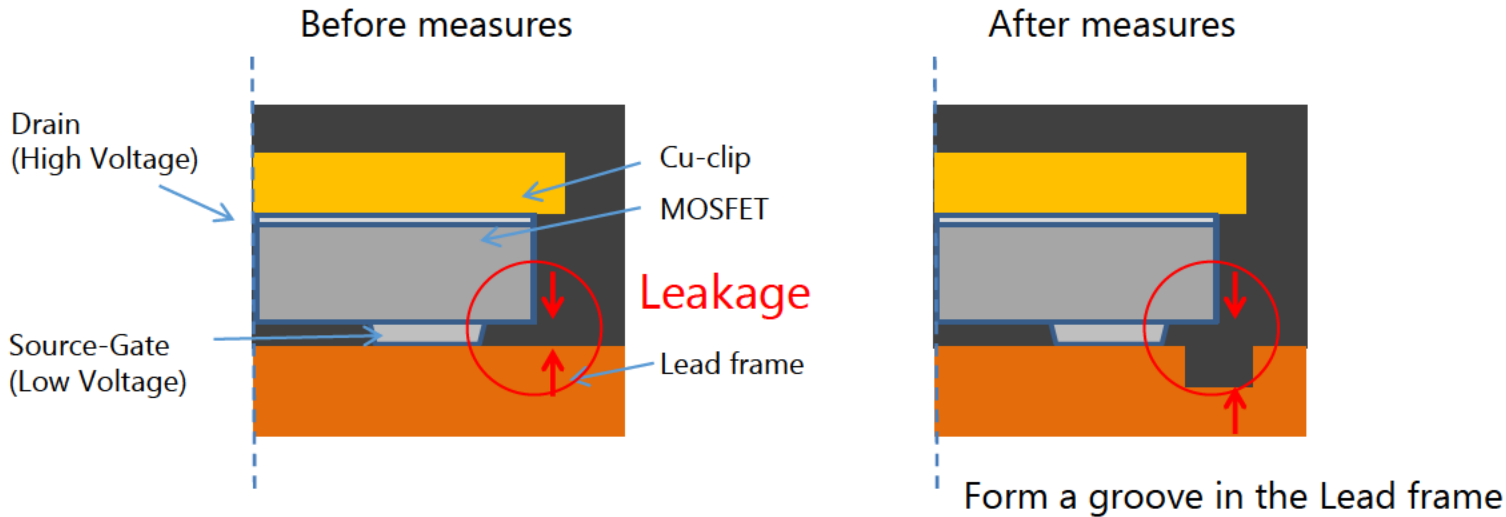
New) Source down



Source : Infineon

# Power QFN with Cu-clip

## Source down structure for High Voltage ( $V_{DS}=100V \leq$ )



### Problem:

- Leakage becomes a problem only with the height of the joint bump.

### Take measures

- Element side(High Voltage) and connection lead(Low Voltage)Secure a certain distance or more.



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