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Innovative Ground Block Pin Design for Improved High-Frequency Test Performance over a Conventional Ground Block Approach

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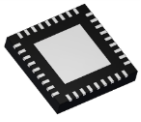
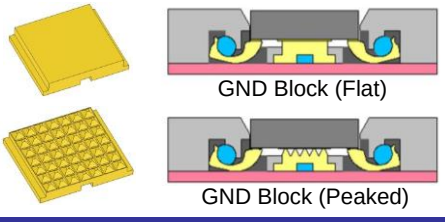
Introduction

- With the growth of electronic products that require wireless connection such as mobile and IoT, there is continuous demand for many high frequency devices.



- High-performance sockets for testing such high-frequency devices are indispensable to ensure product reliability. For reliable testing, it is necessary to ensure stable contact between the pin and the device, but oxides and foreign matter affect test stability, so sockets are required to prevent them.
- Similar to the contact pin, the ground (GND) Block is susceptible to oxides and foreign matter.
- The contact properties are improved by redesigning the tip shape, however, this is not enough.

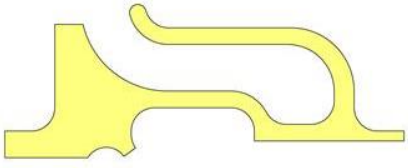


Challenges

- GND Block with scrubbing performance can be used for reliable testing of high frequency devices with less cleaning iteration.
- Low thermal resistance, high current capability and low load are also required.

Innovative Solution … (*International Patent Pending*)

- GND Block Pin (*International Patent Pending*)



Material: BeCu
Plating: NiAu

Mechanical specifications

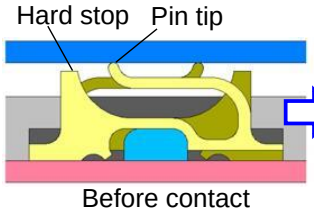
Contact force	0.076±0.015N/pin
Contact stroke	0.06mm
Test height	0.4mm
Mechanical durability	Up to 1M insertions

Electrical specifications

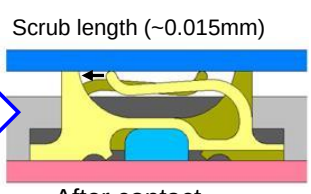
Contact resistance	<0.1ohm
Current rating (Total 4pins)	7.4A
High frequency (GND 24pins)	2.96GHz

Contact Mechanism

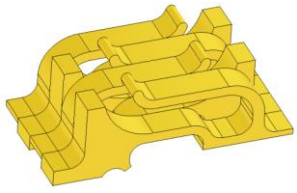
- Pin action and Pin arrangement



Before contact



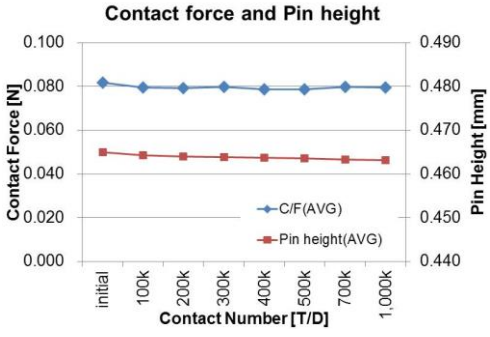
After contact
(Stroke ~0.06mm)

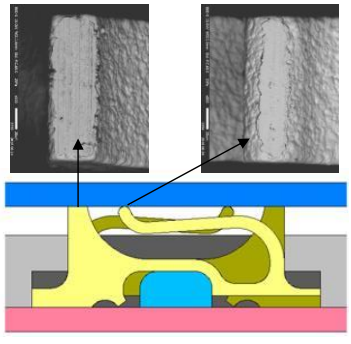


Minimum of 4 GND Block Pins are required to have a complete configuration.

Mechanical Durability

- Conditions: Test stroke 0.06mm, 1M insertions, Room temp.

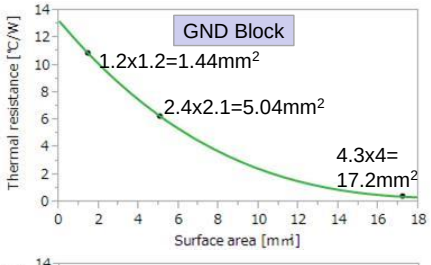


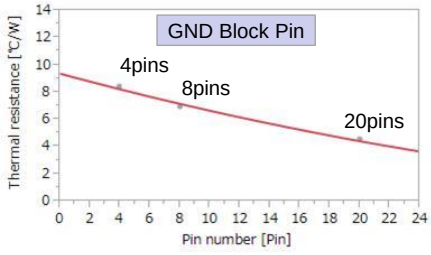


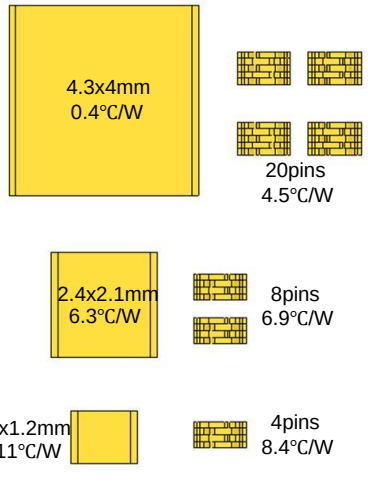
***GND Block Pin did not show any load reduction or pin tip damage.**

Thermal Resistance

- Conditions: Heat source=1W, Applied time=500sec.



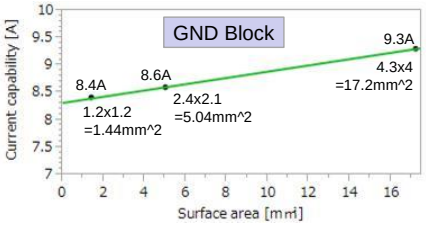


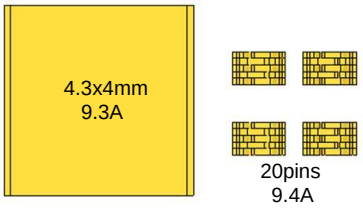


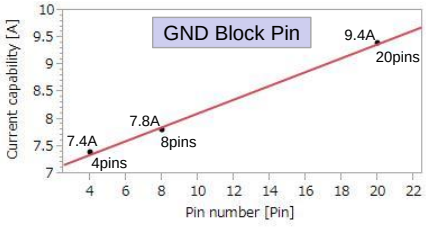
***For small PKG, GND Block Pin has better performance than the GND Block.**

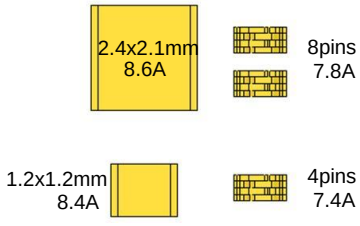
Current Capability

- Conditions: Pin temperature rise less than 20C.





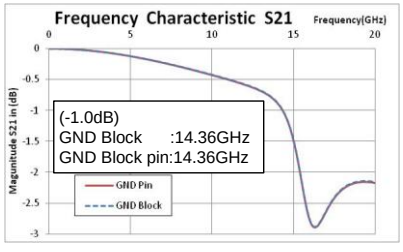


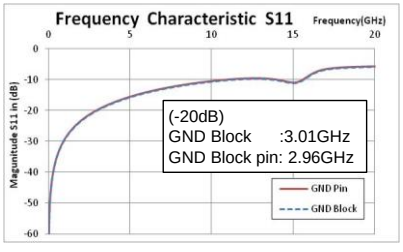


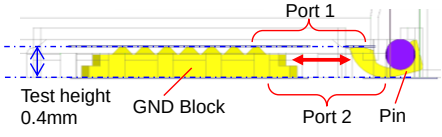
***For large PKG, GND Block Pin has the same performance as the GND Block.**

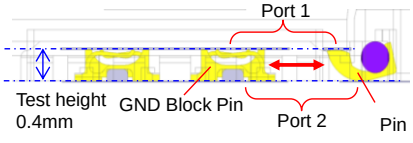
High Frequency

- Conditions: Housing εr=3.3, Elastomer εr=3.0, Device size 5x5mm
  GND Block: 2.8x2.8mm, GND Block Pin: 24 pins









***GND Block Pin has high frequency performance equivalent to the GND Block.**

Conclusion

- High frequency characteristics equivalent to GND Block.
- Stable electrical contact at low contact force.
- Excellent heat dissipation and high current capabilities.
- Cleaning frequency reduction with scrub motion configuration.