As a highly specialized and innovative service provider for Wafer Level Packing services, Pac Tech Asia provides a complete turnkey solution especially for PowerMOSFET products, including front metallization (E-less NiAu/ NiPdAu plating), back grinding, back metallization, dicing and die sorting.

### Wafer Level Back-end Backend Semiconductor Services

#### Wafer Level Back-end Services

##### Complete Turnkey Solution for Front Metallization & Back Metallization

- E-less NiAu
- E-less NiPd
- E-less NiPdAu

- Evaporation TiNiAg
- Evaporation TiNiAu

- ISO 9001:2008 Certified
- ISO 14001:2004 Certified
- ISO TS 16949:2009 Certified

---

### ENIG / ENIPIG Specifications

<table>
<thead>
<tr>
<th>Wafer Size</th>
<th>Wafer Material</th>
<th>Wafer Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 5, 6, 8, 12 inch</td>
<td>Si, GaAs, LiTaOx, Glass (other materials upon request)</td>
<td>Round or Square</td>
</tr>
<tr>
<td>E-less Ni (ENI)</td>
<td>Pd</td>
<td>Au</td>
</tr>
<tr>
<td>0.5 – 3µm*</td>
<td>0.1 – 0.3µm</td>
<td>50 – 100nm</td>
</tr>
</tbody>
</table>

* For UBM or Bump Ni up to 25µm is available

---

### Wafer Thinning and Backmetal Specifications

<table>
<thead>
<tr>
<th>Wafer Diameter</th>
<th>4”</th>
<th>5”</th>
<th>6”</th>
<th>8”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wafer Thickness</td>
<td>≥ 100µm</td>
<td>≥ 100µm</td>
<td>≥ 100µm</td>
<td>≥ 100µm</td>
</tr>
<tr>
<td>Metal type</td>
<td>1) TiNiAg</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other metal stacks upon request</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TTV</td>
<td>&lt; 3µm</td>
<td>&lt; 3µm</td>
<td>&lt; 5µm</td>
<td>&lt; 5µm</td>
</tr>
<tr>
<td>Metal Film Non-Uniformity</td>
<td>~ 3%</td>
<td>~ 3%</td>
<td>~ 5%</td>
<td>~ 5%</td>
</tr>
<tr>
<td>Exclusion Zone</td>
<td>3mm</td>
<td>3mm</td>
<td>3mm</td>
<td>3mm</td>
</tr>
</tbody>
</table>

Wafer Thinning

- Wafer thinning to 100µm
- Poligrding finishing available
- Uniformity of <10mm TTV

Backside Metallization

- TiNiAg and TiNiAu in volume production
- Low stress: High adhesion process
- Less than 20% thickness variation
- Electron beam metallization
- High/low roughness options available

Wafer Dicing

- Dual spindle
- High quality cut

Visit us at [www.pactech.com](http://www.pactech.com)
About Pac Tech

Pac Tech is a worldwide leader in electronless NiAu, NiPd and NiPdAu turnkey solution with over 15 years of experience in this field. We are offering worldwide subcontractor services with a facility in Europe, USA and Asia. Our services include wafer level bumping and wafer level packaging. We also provide solutions for wafer level solder ball attach and wafer level metalization (OPM/UBM bump). Our E-less OPF is qualified for high temperature high reliability Au and Cu wire-bonding. In addition we offer a complete spectrum of backend services on wafer level including backgrinding and backmetalization.

Front Metallization

The electronless nickel/gold process technology is a simple wet chemical process that is self-patternning and therefore involves lower costs in relation to its total capital investment and operational costs. The nickel thickness is between 2 and 25µm depending on the application. Palladium is deposited in the range of 1000-3000Å, and gold is typically deposited between 300 and 1000Å. Typical Ni thickness for MOSFET ranges from 3-5µm.

Wafer Thinning

We are using the latest leading-edge machine from Disco, we can provide thinning in different wafer thicknesses down to 100um on Si and GaAs devices. We provide a series of backgrinding finishes and roughness, including Grid# 1200, 2000 and Poligrind. Chemical stress relief is offered as an additional option.

Backside Metallization

PacTech uses latest state-of-the-art evaporation based e-beam technology in order to achieve reliable and reproducible adhesion of the backmetal. All processes are controlled by Online RGA analysis. The vacuum level and humidity level in the chamber is controlled by SPC. For the metal thickness measurement, we are using non-destructive XRF analysis depending on customer request.

With our fast prototyping line, we provide 24-hour delivery for first Si and multiproject wafers using maskless process. PacTech offers worldwide leading electronless NiAu, NiPd, NiPdAu processes with longer in the industry as a sub-contractor. The electronless process is a low cost, maskless, wet chemical metalization. E-less metalization can be used as solderable UBM or as wire-bondable OPM. NiPd and NiPdAu can be used for wire bonding using Copper as well.

Dedication to the Highest Quality


PacTech provides an in-depth quality and reliability system that ensures total customer satisfaction. From incoming inspection through each and every step of the process, PacTech monitors each order to make sure that all of the customers requirements are met.

A Reliable Partner to the Leading Global Players

PacTech Asia cooperates with IDMs, OEMs and fabless design houses around the world by providing technology services not only for high volume consumer electronic applications but also for high reliability, high temperature automotive and aerospace products.

Process Flow for Turnkey Processes

- Incoming Wafer Inspection
- Frontside Metallization (NiAu/NiPdAu)
- Frontside Taping
- Wafer Thinning
- Backside Metallization
- Tape & Reel
- Wafer Thickness
- Detaping
- Wafer Probe
- Backside Taping
- Metal Thickness
- Online RGA Monitoring
- Wafer Probe Test *
- Die Sort
- Outgoing Logistic

PacTech Asia is a reliable production facility specialized in mass volume production in Wafer Level Packaging. The production site located at Bayan Lepas Industrial Zone, Penang, Malaysia is well-equipped with below facilities:

- Cleanroom class 1k and 10k
- ESD Compliance
- 24-hour CCTV Monitoring
- Manufacturing Execution System

- Inline Statistical Process Control Monitoring
- Online RGA Monitoring

Residual Gas Analyzer (RGA) is a small mass spectrometer designed for process control and contamination monitoring in vacuum systems. It is used to monitor the humidity and gases present in the chamber during evaporation process.

- Different surface roughness from 1000A down to below 100A are available with optional mate finishing and mirror finishing using different backgrinding roughness and etching techniques. The adhesion of the metal is monitored with a highly specialized peel test.

PacTech has a series of state-of-the-art double spincoating machines for wafers from 4” to 12” diameter. We offer a series of tapes including UV Tape and Non-UV Tape. Our processes are highly controlled with optional AOI control of front side and back side chipping.

Tape & Reel is a value-added service for our turnkey solution here in PacTech Asia. The components are placed in specifically designed pockets embossed in a plastic carrier tape and it is sealed with the cover tape to keep the parts in place in the pockets.

The quality of back metalization is assured with inline peel test. PacTech Asia has developed multiple rigorous peel test monitoring methods to ensure the products delivered to customers are with highest quality.