

POWER MODULE HOUSING

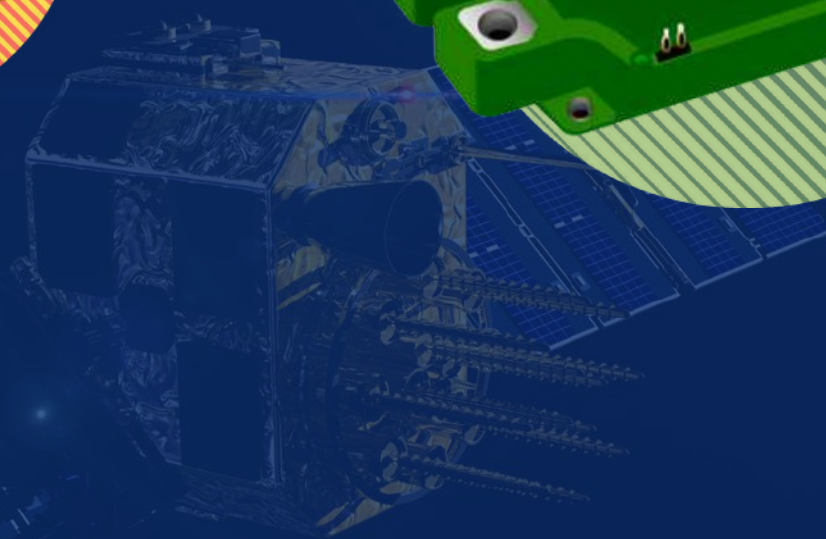
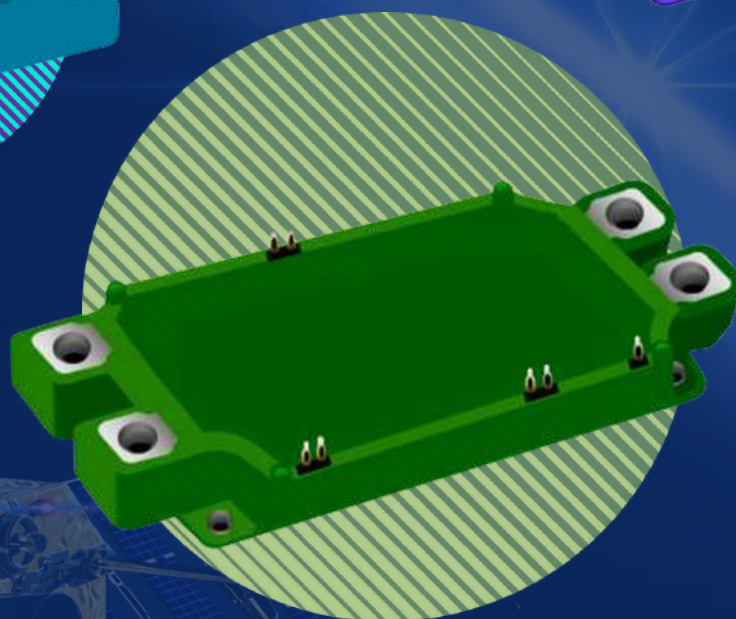
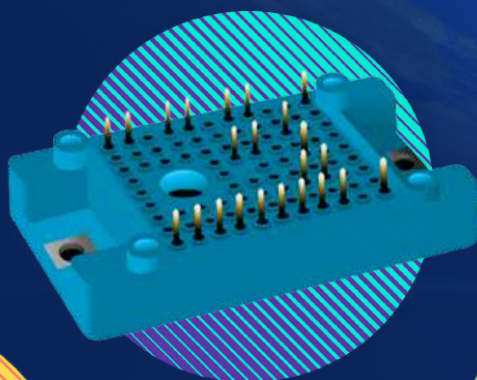
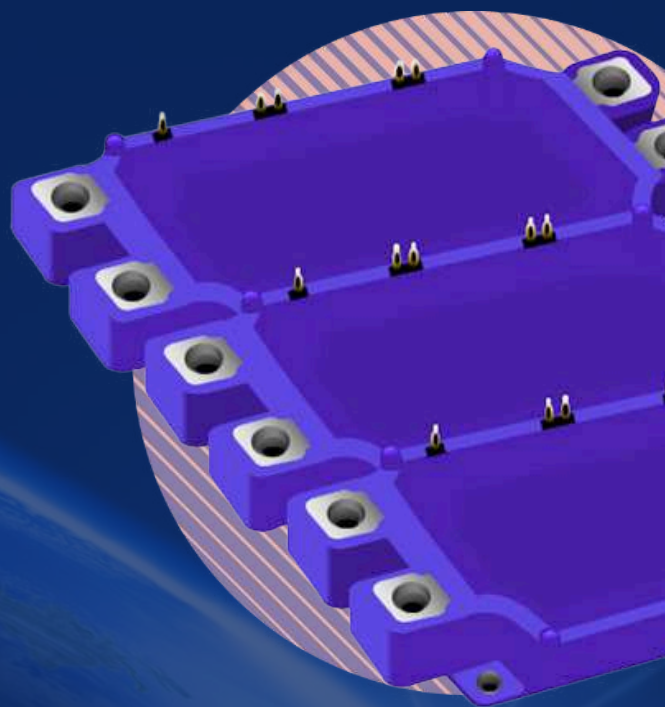
POWER MODULE BASEPLATES

PROGRESSIVE STAMPING

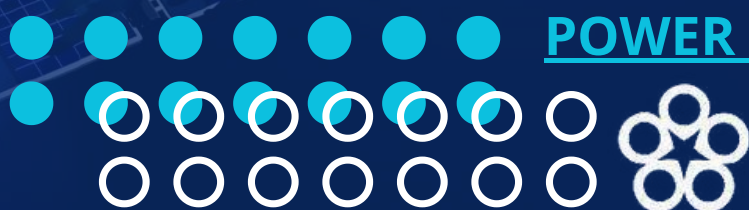
COMPONENTS ASSEMBLY

INSERT MOLDING

OVERMOLDING



POWER ELECTRONICS



LAYANA



Your Ally on Making
Power Electronics **GREENER**



**GREEN
FACTORY
CERTIFIED**



**GREEN
BUILDING
CERTIFIED**



**CLEANER
PRODUCTION
CERTIFIED**

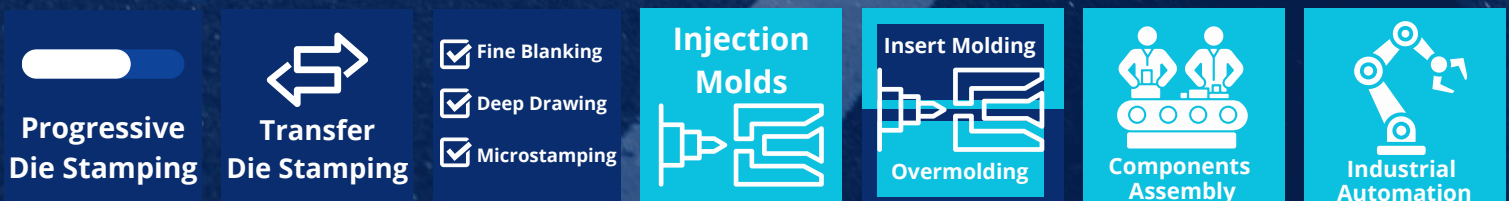


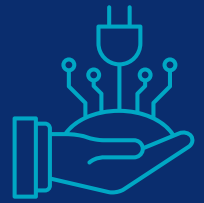
**ISO 50001
ISO 14064**





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»»»» Layana 's Role in Power Electronics Industry

Power electronics is a critical branch of electrical engineering that deals with the conversion and control of electrical energy using power semiconductor devices such as transistors, diodes, and thyristors. These devices are integral to a wide array of applications, including power supplies, motor drives, renewable energy converters, electric vehicles (EVs), and more.

Layana Company plays a vital role in this industry by providing essential components for power electronic systems. Specializing in advanced plastic injection molding and metal stamping technologies—particularly insert molding—Layana produces high-performance components for power electronic systems, including IGBT, SiC, MOSFET, GaN, and hybrid power modules.

Power
Module
Housing

Power
Module
Baseplates

Busbars,
Connectors,
Lead Frames,
Pins









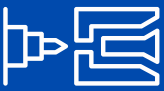






Components
Assembly

Insert
Molding &
Overmolding

- **Manufacturing of Power Module Housings:** Layana utilizes insert molding to develop and produce power module housings with integrated metal components. These components, such as power terminals, control terminals, and other support materials, are manufactured through progressive die metal stamping. The housing protects the internal components of the power module from environmental factors like heat, humidity, and physical damage, ensuring optimal performance and longevity.
- **Production of Base Plates:** is also known as cooling plates—which are essential for thermal management in power modules. These base plates act as heat sinks, dissipating heat generated during operation and preventing overheating. Layana employs advanced metal stamping technologies to produce base plates that meet strict performance and dimensional requirements, ensuring efficiency and reliability.
- **Expertise In Insert Molding & Overmolding:** Layana's expertise in insert molding allows them to integrate plastic components such as terminals, connectors, pins, and busbars directly into the housing. This integration simplifies assembly and enhances the performance of the power module by ensuring precise and robust component placement.

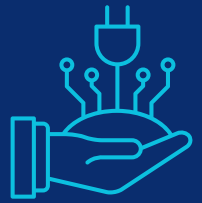


»»» Layana Capabilities

Metal Stamping	 <p>Progressive Die Stamping</p>	 <p>Die Dimensions</p> <p>1,200 Kg max</p>	 <p>Die Weight</p> <p>Up to 2500 mm 2500L*1000W*550H</p>	 <p>Precision</p> <p>Tolerance range Up to ± 0.01 mm</p> <p>CpK ≥ 1.67</p>
	 <p>Press Machines</p> <p>From 25 to 300 Tons</p>	 <p>Techniques</p> <ul style="list-style-type: none"> ✓ Fine Blanking ✓ Deep Drawing ✓ Microstamping 	 <p>Our value</p> <ul style="list-style-type: none"> ✓ In-house Tooling Workshop ✓ Scientific Approach ✓ Dedicated Tooling Engineers ✓ Dedicated Automation Engineers ✓ Project Assembly Capability 	 <p>Transfer Die Stamping</p>
Injection	 <p>Injection Molds</p>	 <p>Product size</p> <p>Inch: 8.5*11*6 Milimeter: 216*279*150</p>	 <p>Injection Machines</p> <p>Vertical: From 35 to 250 Tons Horizontal: From 60 to 200 Tons</p>	 <p>Precision</p> <p>Mold: ± 0.05 mm Product: ± 0.03 mm</p>
Other	 <p>Bi-Material Expertise</p> <ul style="list-style-type: none"> ✓ Insert Molding ✓ Overmolding 	 <p>Advanced Automation Integration</p>	 <p>Assembly and Subassembly</p>	

Scan for more information





»»» Power Modules

Power Modules: Essential for Efficient Energy Management

Power modules are critical components that supply power to semiconductor devices while offering efficient cooling solutions and connections to external circuits. They are mechanically and thermally optimized to facilitate assembly and ensure prolonged, reliable operation. Manufacturers design these components to meet the specific requirements of diverse applications, spanning from consumer electronics to industrial automation and renewable energy systems.

Types of Power Modules

IGBT (Insulated Gate Bipolar Transistor)

Constructed from silicon, IGBTs combine the simple gate-drive characteristics of MOSFETs with the high-current and low-saturation-voltage capability of bipolar transistors. They offer moderate switching speeds and frequencies, making them suitable for applications such as:

- *Inverters, Motor drives, Power supplies*

SiC (Silicon Carbide)

Made from silicon carbide, SiC modules exhibit higher switching speeds and frequencies compared to silicon-based devices, along with excellent thermal conductivity and higher breakdown electric field strength. This makes them ideal for:

- *High-efficiency inverters, Power supplies, High-temperature and high-voltage applications*

MOSFET (Metal-Oxide-Semiconductor Field-Effect Transistor)

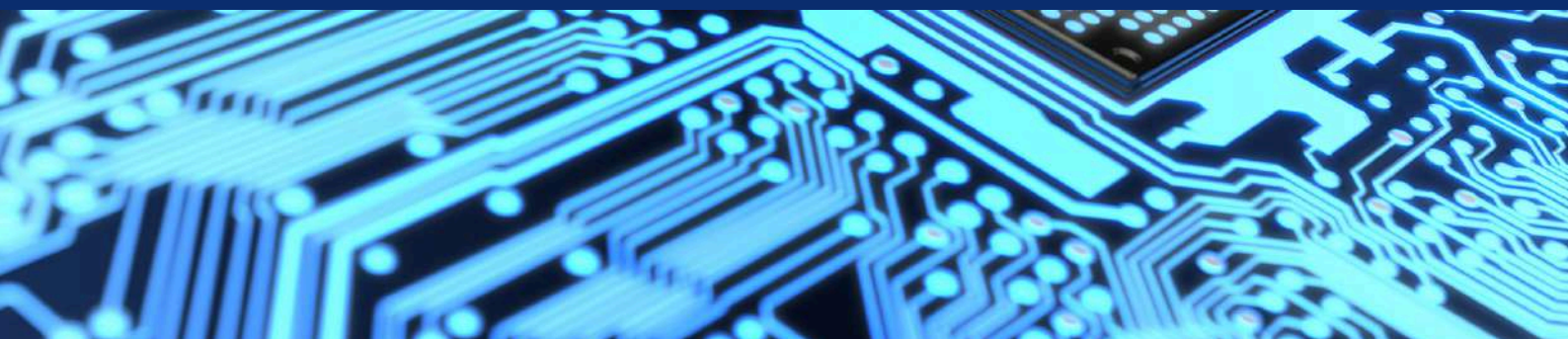
Also silicon-based, MOSFETs are characterized by very high switching speeds and frequencies but typically handle lower voltages compared to IGBTs. They are suitable for:

- *High-frequency circuits, RF amplifiers, Switch-mode power supplies*

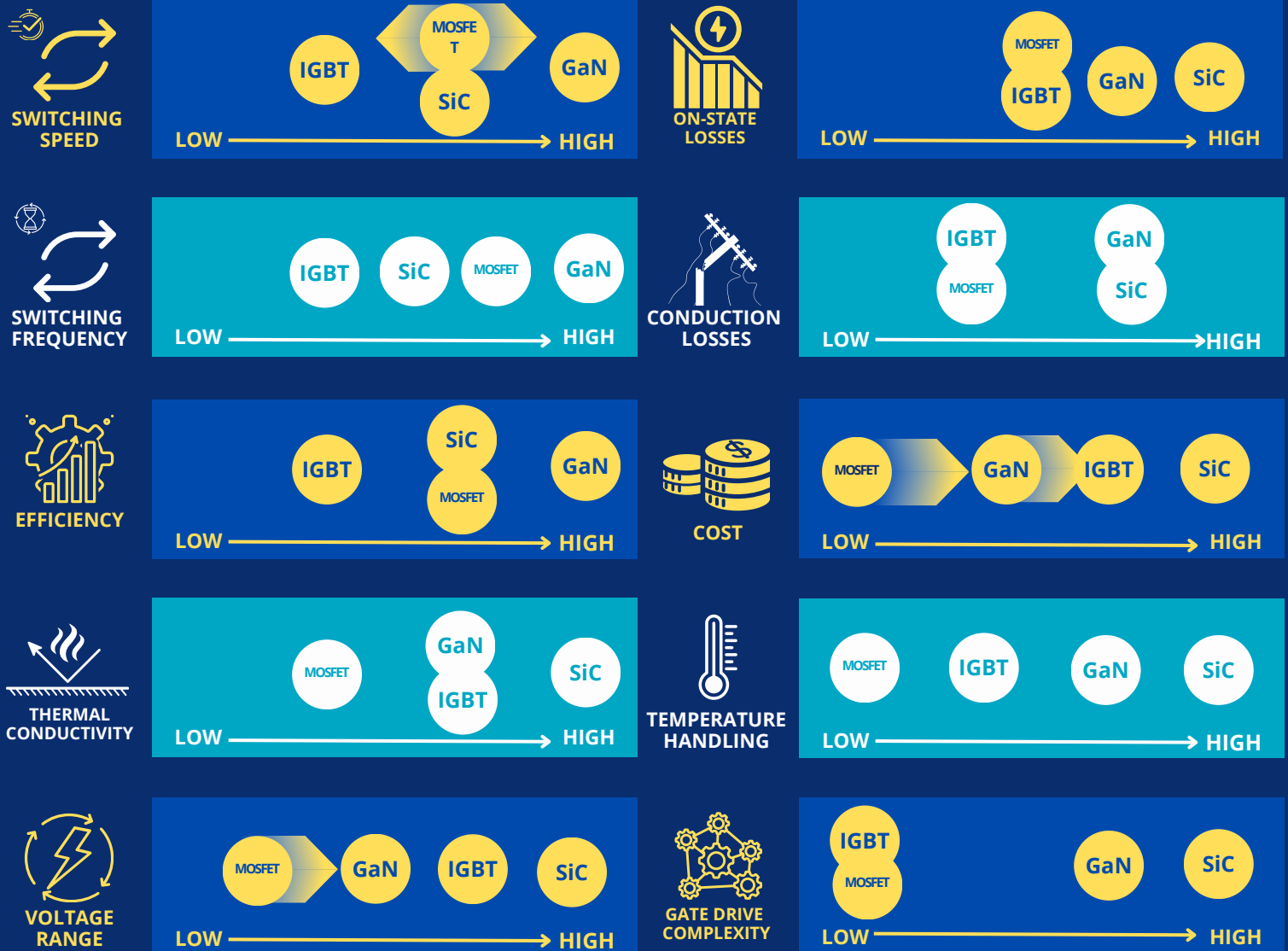
GaN (Gallium Nitride)

GaN modules offer even higher switching speeds and frequencies than both SiC and silicon MOSFETs, due to the superior electron mobility in GaN material. Known for their high efficiency and compact size, they are suitable for:

- *Fast-charging systems, High-frequency converters, Telecommunications equipment*



The next infographic provides a comprehensive visual comparison of IGBT, MOSFET, SiC, and GaN, highlighting their strengths and trade-offs in areas such as efficiency, switching speed, thermal management, and cost:



Source: Internal resources from Layana Company.

N. B.: This table is intended for reference purposes only, as it provides a simplified overview of standards and typologies. Layana offers this information as a general guide. A comprehensive professional evaluation is required to determine which type of power module best suits the specific needs of your project.





LAYANA

● ● POWER ELECTRONICS

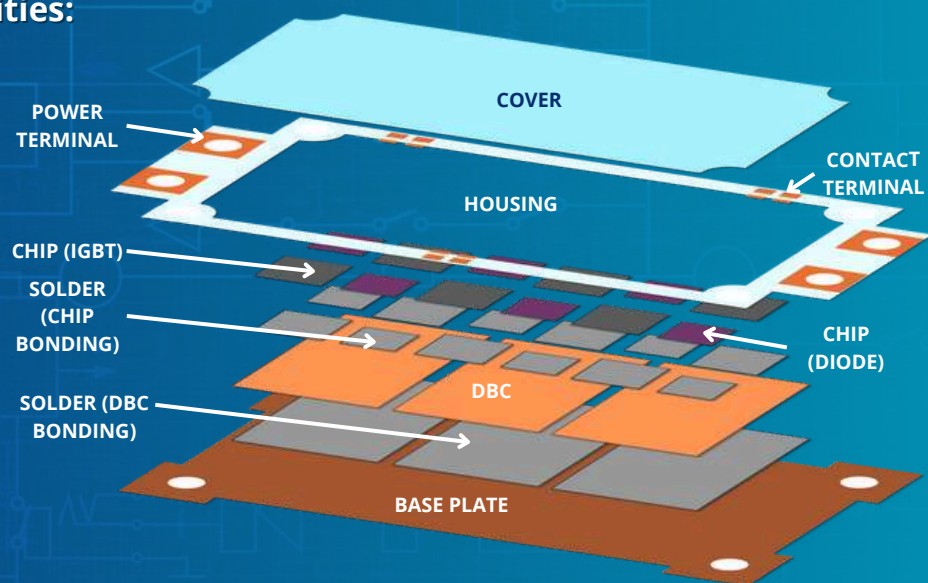


Power Module Housing

Layana Company is trusted by the world's leading power electronics OEMs for manufacturing power module housings—also known as enclosures or casings. Essential for IGBT, SiC, MOSFET, and GaN modules, these housings feature smaller components embedded in the plastic during injection molding, ensuring **high-quality bonding** and **reliable performance**.

Our Manufacturing Capabilities:

- **Progressive Die Stamping:**
Terminals, Pins, Connectors, Busbars, and Base plates.
- **Insert & Injection Molding:**
Housings, Covers
- **Sub-assembly:** Power module housing



Power module housings are produced using various technologies, such as progressive metal stamping for components like **terminals**, **busbars**, and **pins**, which enables cost-effective, high-precision production. Insert molding is also employed to integrate metallic, plastic, rubber, and other components, improving material bonding, reducing assembly steps, and enhancing the product's durability. These housings typically consist of two main parts: the **housing**, which provides mechanical support and enables system integration, and the **lid**, which protects internal components.

Busbars and
Lead frames

Connectors

Other
Custom-
made Metal
Parts

Press-fit Terminals

Fasteners



NEW MOBILITY



GREEN ENERGY



INDUSTRY



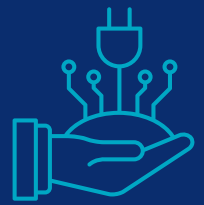
TELECOM



HVAC SYS.

By combining our **expertise in insert molding and metal stamping**, Layana provides comprehensive power module solutions for manufacturers, catering to the needs of world-class companies in the power electronics industry. Layana's focus on advanced manufacturing techniques enables them to deliver power module systems optimized for durability, thermal management, and seamless integration into a wide range of applications, from automotive and industrial to renewable energy and consumer electronics.





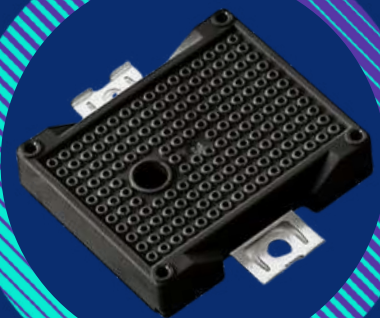
**Progressive &
Transfer Die
Stamping**



**Bi-material
Expertise**



**Advanced Insert &
Overmolding**

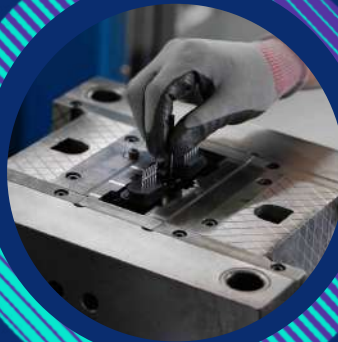


**In-house
Tooling &
Molds
Workshop**

**Collaborative
Development
Manufacturing**



**IATF 16949
Standard**



**Dedicated
Tooling
Engineering
Team**



**Total Quality
Management**

**Green Factory
Certificated**

Any project in your mind?

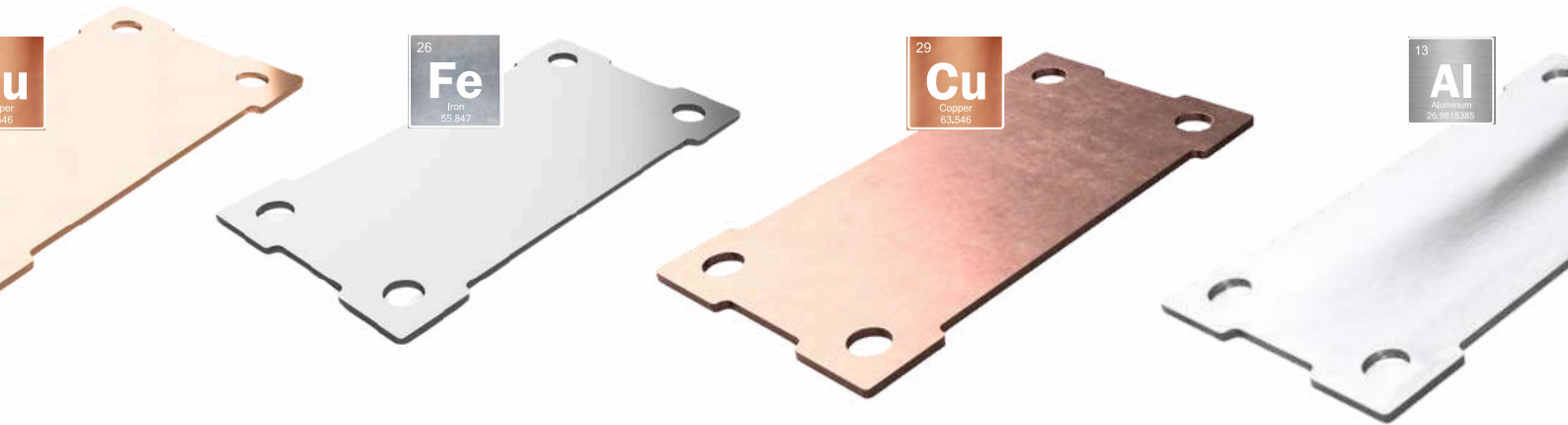
Layana Team helps you to achieve success

Email us at layana@layana.com





Power Module Baseplate



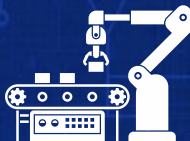
The manufacturing of **power module baseplates** requires meticulous attention to detail, focusing on heat dissipation, thermal conductivity, and structural integrity. Various materials, including metals like copper and aluminum are used for their thermal and mechanical properties. Advanced techniques like metal stamping and fine blanking are employed to produce these baseplates with precision, ensuring minimal warpage and high-quality standards. The baseplates not only support the power module's components but also enhance durability and reliability under demanding operational conditions.



Bi-Material Expertise

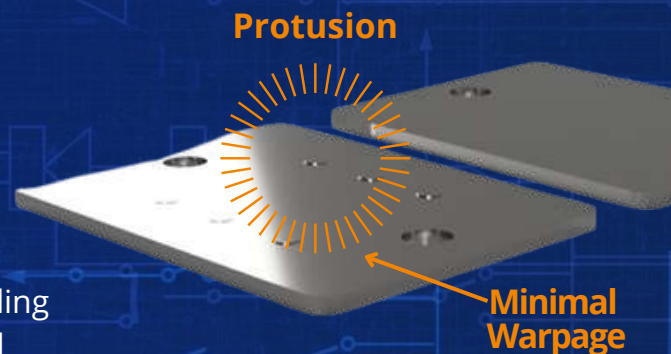


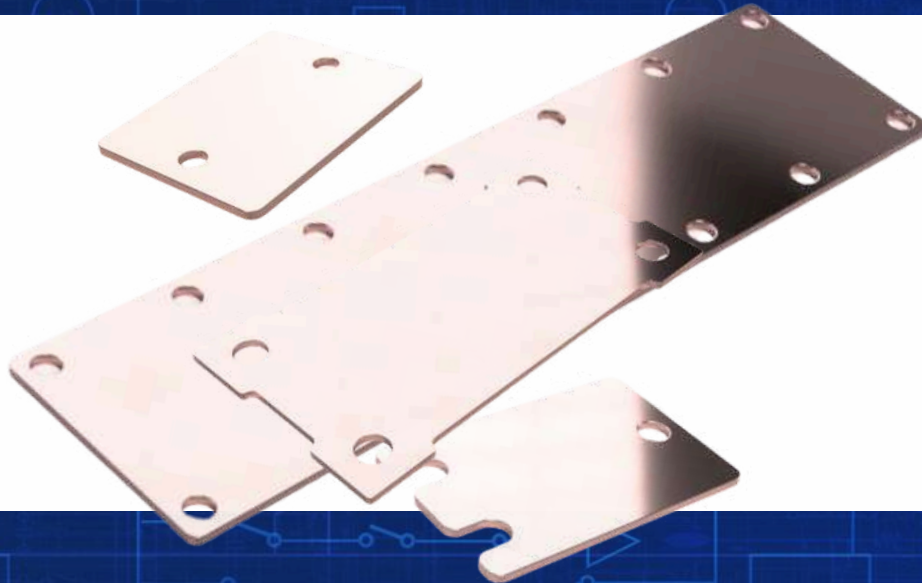
Automation Integration



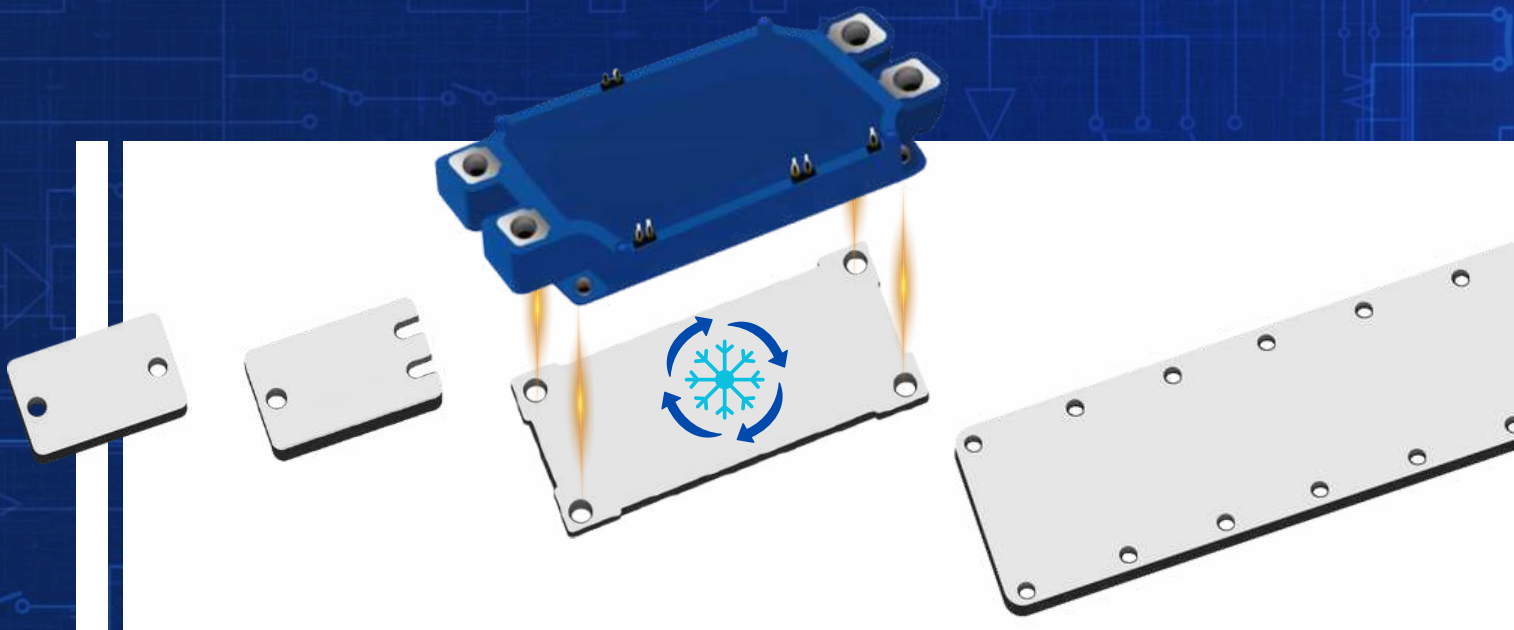
Project Assembly

With rigorous quality control and expert design and engineering support, Layana ensure base plates meet stringent specifications, providing manufacturers with enhanced quality, increased efficiency, and cost savings.





- **Flatness and Warpage Control:** Base plates must exhibit precise flatness and minimal warpage. Reducing the warpage is critical to maintaining the module's performance and reliability, especially after the complex process of metal/ceramic substrate joining.
- **Protrusions and Cutouts:** Base plates are often designed with protrusions and cutouts to accommodate the power module's various components. These cutouts must be produced with high precision to support easier soldering and efficient assembly.



Power Electronics Components Assembly



**In-House
Tooling and
Mold Workshop**



**Advanced
Bi-material
Techniques**



**Advanced
Assembly
Capabilities**

Layana Company offers extensive multi-material expertise, supported by dedicated engineering teams specializing in plastics, metals, assembly, and automation—all under one roof, including tooling capabilities. This integrated approach accelerates assembly and manufacturing processes, catering to any project's needs within the power electronics industry.



Bi-material Proficiency - Insert and Overmolding



Mold Flow Simulation

 **Bi-material Expertise**

 **Collaborative Design**

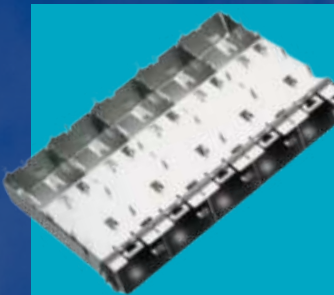
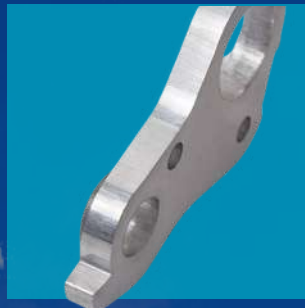
 **Fast Prototyping**

 **Highest TQM**

 **Scientifically Driven Methods**


 **Advanced Simulation**






Automotive


Biking


Electronics


Medical


Aerospace

 **LAYANA**

Metal Stamping | Plastic Injection | Insert Molding |
Automation | Assembly | Rapid Prototyping

**Metal Stamping | Plastic Injection | Insert Molding |
Automation | Assembly | Rapid Prototyping**

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Scan for Visit



Automotive



Biking



Electronics



Medical



Aerospace