



TOLL

1、基本特点：

小体积：相比传统封装（如 TO-263），TOLL 封装的 PCB 占板面积减少 30%，高度降低 50%，电路板空间利用率提高 60%，适合紧凑型设计。

低寄生电感与电阻：通过优化内部结构，TOLL 封装的寄生电感和电阻极低，可减少开关损耗，提高系统效率，尤其适用于高频、大电流应用。

高散热性能：散热路径为“junction→case→solder→pcb→vias→pcb→tim→heatsink”，虽路径较长，但散热效率高，能有效降低器件温升，延长使用寿命。

高电流承载能力：可承载高达 600A 的电流，满足电动汽车、数据中心、储能系统等大功率场景需求。

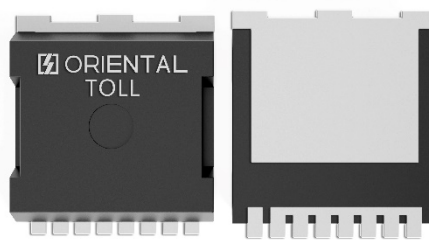
1. Basic Features

Compact Size: Compared with traditional packages (e.g., TO-263), the TOLL package reduces the PCB footprint by 30%, cuts the height by 50%, and increases the circuit board space utilization by 60%, making it ideal for compact designs.

Low Parasitic Inductance and Resistance: With optimized internal structure, the TOLL package achieves ultra-low parasitic inductance and resistance. This minimizes switching losses and enhances system efficiency, rendering it particularly suitable for high-frequency and high-current applications.

Excellent Thermal Performance: The heat dissipation path follows the route of *junction→case→solder→PCB→vias→PCB→TIM→heatsink*. Despite the relatively long path, it delivers high heat dissipation efficiency, which can effectively reduce device temperature rise and extend service life.

High Current-carrying Capacity: It can handle current up to 600A, meeting the requirements of high-power applications such as electric vehicles, data centers and energy storage systems.



2、封装结构与引脚布局：

无引脚设计：TOLL 为无引线封装（Leadless），芯片通过金属打线连接到封装底部的焊盘，直接与 PCB 焊接，减少引线电感和电阻。

多打线连接：最多可放置 6 根 20mil 的金属打线，支持大电流传输，降低封装电阻至 0.2mΩ 左右。



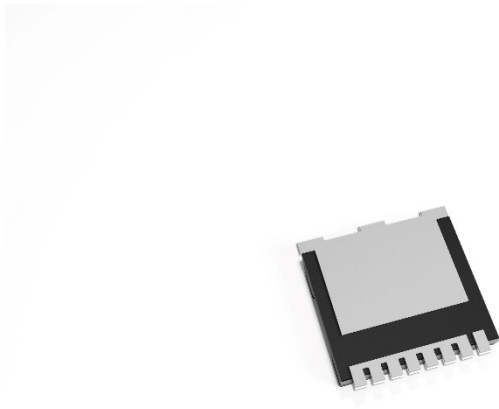
Kelvin 连接: 对栅极驱动的信号源端子进行 Kelvin 连接, 减小源极线电感, 提高开关速度, 降低开关损耗。

2. Package Structure and Pin Layout

Leadless Design: The TOLL package features a leadless structure. The chip is connected to the pads on the bottom of the package via wire bonding and soldered directly onto the PCB, which reduces lead inductance and resistance.

Multi-wire Bonding Configuration: It can accommodate up to 6 metal bonding wires of 20 mils, enabling high-current transmission and reducing the package resistance to approximately 0.2 mΩ.

Kelvin Connection: A Kelvin connection is applied to the signal source terminal of the gate drive. This design minimizes source wire inductance, improves switching speed, and lowers switching losses.



3、应用场景：

电动汽车：用于电池管理系统（BMS）、电机控制器，支持高功率密度和快速充电。

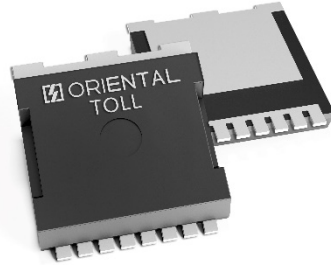
数据中心：适用于服务器电源、通信基站电源，提高电源转换效率和可靠性。

储能系统：如光伏逆变器、储能电池管理系统，优化能量转换和存储。

工业设备：电机驱动、电源模块等，满足高功率、高可靠性的要求。

3. Application Scenarios

- **Electric Vehicles:** Used in Battery Management Systems (BMS) and motor controllers, supporting high power density and fast charging.
- **Data Centers:** Suitable for server power supplies and communication base station power supplies, improving power conversion efficiency and reliability.
- **Energy Storage Systems:** Such as photovoltaic inverters and energy storage battery management systems, optimizing energy conversion and storage.
- **Industrial Equipment:** Motor drives, power modules, etc., meeting the requirements for high power and high reliability.



4、与其他封装对比:

与 TO-220、TO-263 对比: TOLL 封装在电流承载能力、散热性能和占板面积上更具优势, 尤其适合大电流、高功率密度应用。

与 TOLT 对比: TOLT 为顶部散热封装, 散热路径更短, 热阻更低, 适用于对散热要求极高的场景; TOLL 则以底部散热为主, 兼顾空间利用和散热性能。

4. Comparison with Other Packages

Comparison with TO-220 and TO-263: The TOLL package offers superior advantages in current-carrying capacity, thermal performance, and PCB footprint, making it particularly suitable for high-current and high-power-density applications.

Comparison with TOLT: The TOLT package is a top-cooled package featuring a shorter heat dissipation path and lower thermal resistance, which is ideal for scenarios with extremely high thermal requirements. By contrast, the TOLL package is primarily bottom-cooled, achieving a balanced performance between space utilization and thermal dissipation.