

knowLEDge:

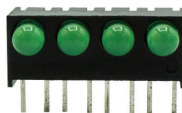
LED Indicator Design Tips, Tricks and Best Practices.

Things to know when choosing between THT and SMT LEDs for circuit board indicators

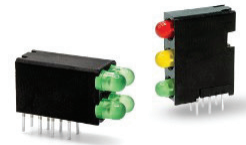


When incorporating LED indicators in printed circuit board (PCB) applications, design engineers must decide between surface mount technology (SMT) LEDs and through-hole technology (THT) LEDs. Here are some key considerations when making this choice:

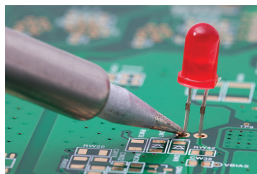
THROUGH-HOLE TECHNOLOGY (THT)



Housed THT LEDs allow for ganged arrays which are not offered in SMT.

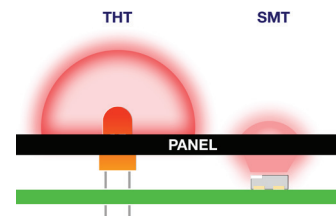


THT LEDs are easier to replace or upgrade selectively if needed. SMT LEDs require specialized tools for desoldering.



THT LEDs are installed manually by inserting leads through holes and soldering. This takes more time and labor.

Housed THT LEDs allow for multi-level configurations 2 to 4 high without sacrificing space on the PCB.



The viewing angle and brightness specifications should be evaluated to ensure the chosen technology meets visibility needs. THT LEDs provide direct viewing of the LED, allowing for higher intensity and in some cases wider viewing angles.



THT LEDs can withstand more mechanical stress and vibration as the leads provide support. SMT LEDs rely solely on the solder joint.

Regulations may dictate the use of THT LEDs in certain applications like high-reliability aerospace systems.

SURFACE MOUNT TECHNOLOGY (SMT)



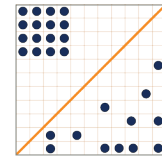
SMT LEDs take up less space on the board since they do not require drill holes. This enables tighter packing densities and a smaller overall circuit size.



SMT LEDs generally have better thermal management as the flat bottom surface adheres closely to the PCB for heat conduction.

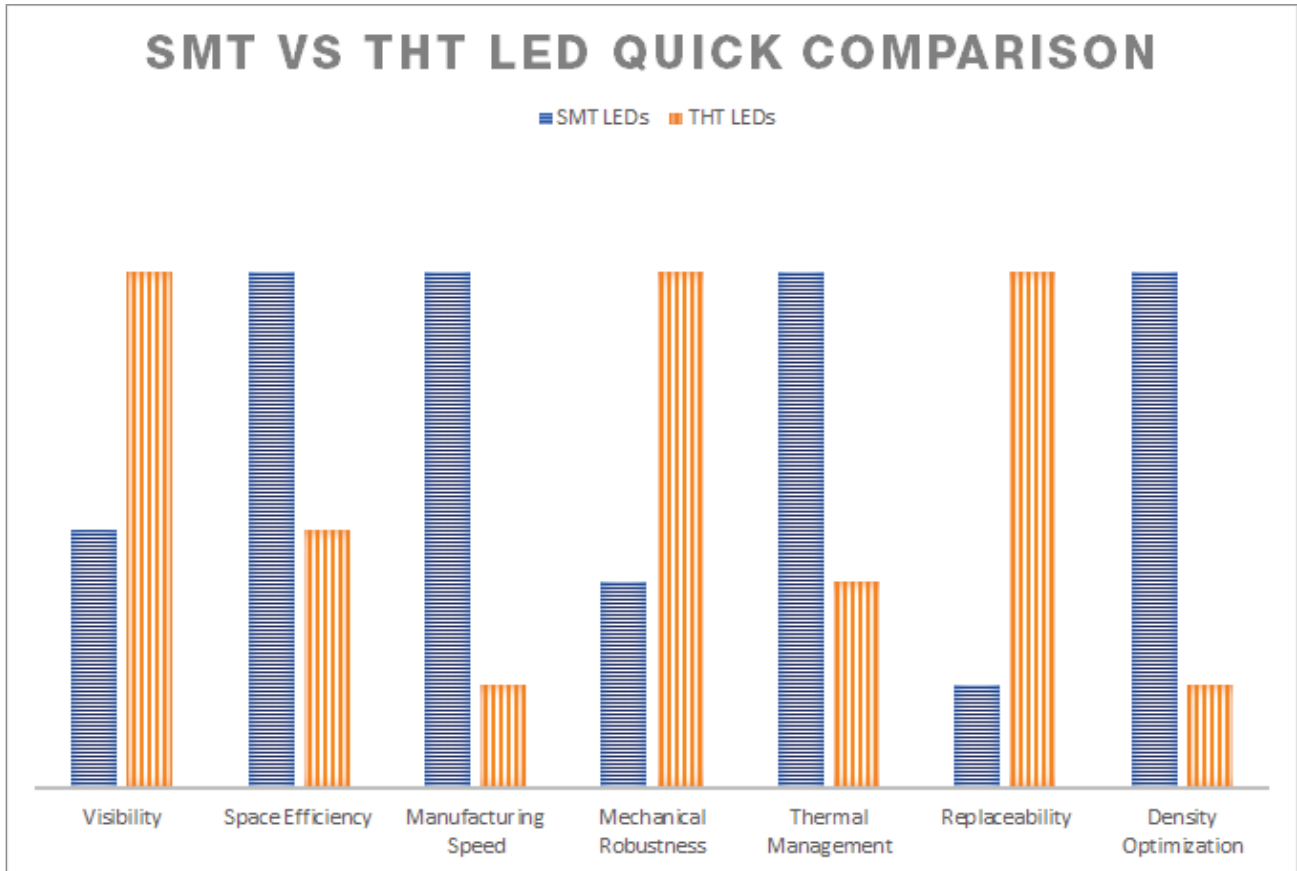


SMT LEDs allow for automated assembly and faster production. The LEDs are simply placed and soldered by pick-and-place machines.



SMT LEDs are recommended for high-density designs with space limitations. THT LEDs allow more flexibility in positioning.

This chart visually captures the main trade-offs between the two technologies when designing with LED circuit board indicators



SMT LEDs are usually preferred for small, compact indicator designs thanks to their miniaturized footprint. But THT LEDs have advantages in resilience, serviceability, and flexibility. Consider all factors including long-term maintainability and inspection requirements when selecting the best LED indicator technology for your application design.