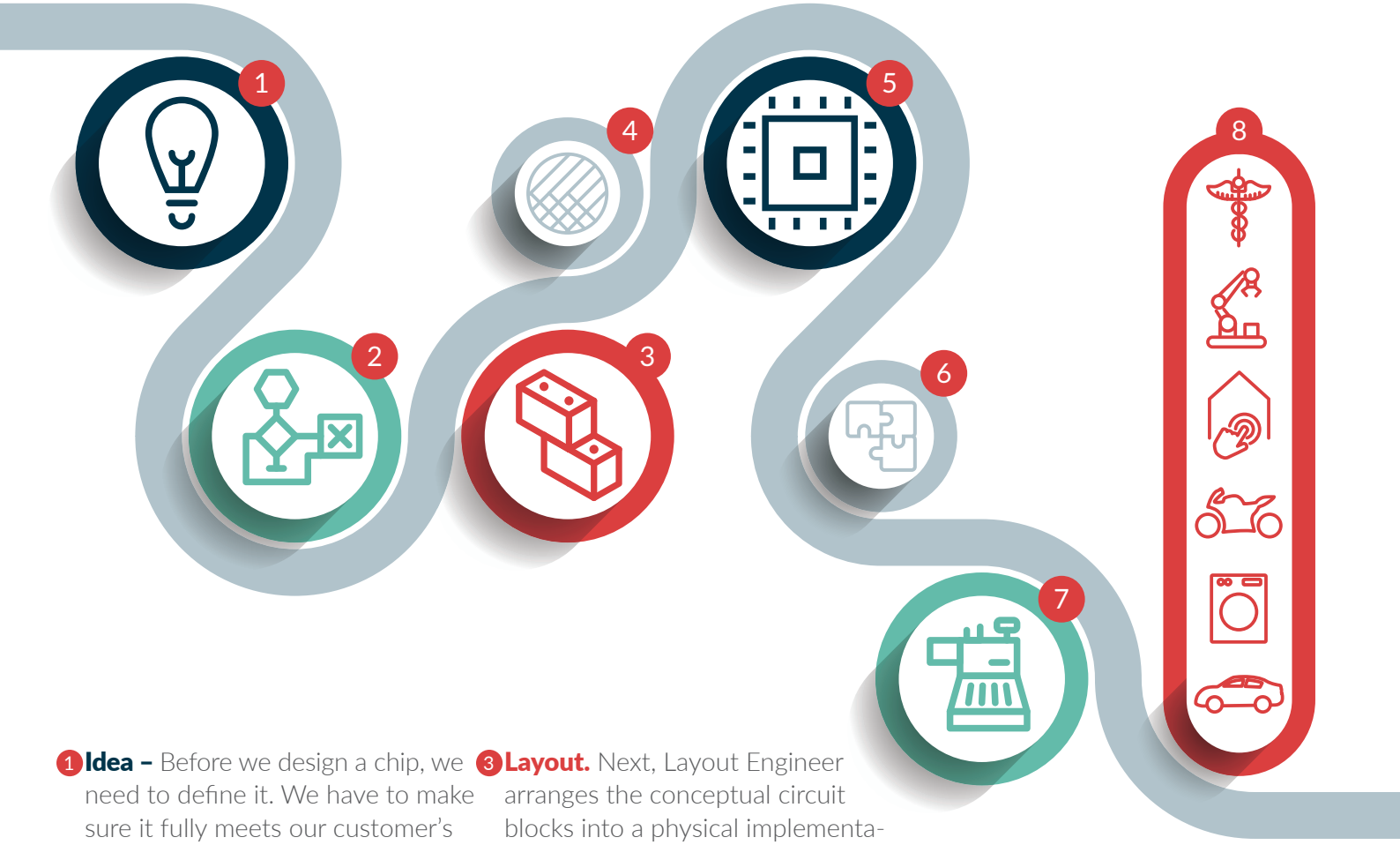
Melexis
INSPIRED ENGINEERING

Enjoy your trip through the secret life of a silicon chip.
You will see where you are going to apply your knowledge and skills.



1 **Idea –** Before we design a chip, we need to define it. We have to make sure it fully meets our customer's needs, so we collect all information on the chip's functions and operating conditions, such as temperature, current pressure and more.

2 **Design.** Once the chip definition is complete, System Architect develops a plan consisting of several circuit blocks, each with its own specification. These blocks are then implemented by Design Engineer, who uses basic elements (transistors, resistors) to build a virtual circuit, the correct functionality of which is verified based on models and simulation using Computer-Aided-Design tools (e.g. Cadence). Then the individual blocks are combined and further optimized to minimize chip area but also for instance avoid signal interference and excessive noise to finally meet specifications.

3 **Layout.** Next, Layout Engineer arranges the conceptual circuit blocks into a physical implementation. The resulting chip image looks like an aerial view of a city, with streets and buildings and parking lots → our chip!

4 **Wafer fab.** Once we are happy with the chip layout, it is time to bring the chip to life. Copies of its layout are made on a single silicon wafer, made from pure sand (or silica). In the wafer fab, the layout is then transformed into a working chip. Number of chips per wafer varies between few thousands to few tenth thousand depending of the chip size/complexity.

5 **Wafer probe.** After the wafer is made, it needs to be functionally tested for possible defect. Wafer testing, also known as probing, involves very fast testing the chip (few hundreds msec) via tiny needles which electrically connect each chip to the tester and allow high parallel factor test (up to 64 chips in parallel).

6 **Assembly.** Chips are made of silicon and need protection to be used in final application. Chips are typically encapsulated in a small plastic housing. Chip is then accessible from the outside via fine electrical connections – called bondwire.

7 **Final test.** Packaged chips are then shipped back to Melexis. Each chip is tested just like in probing to detect possible defect happening during Assembly. Final testing is done at different temperatures, typically -40°C, 25°C and 125°C.

8 **Customers –** Chips are everywhere. In a world where the pace of automation is accelerating, Melexis' chips are no longer just for the road. Sensors and integrated circuits are also increasingly finding their way into industrial applications (robots), at home (e.g smart appliance), for health personal monitoring (e.g smart watch) and in many more consumer goods.