How does 210W fast charging work? How does it affect battery life?

Xiaomi is the first company to make 210W charging a reality. In November 2022, it introduced 210W charging, allowing the 4,000 mAh battery to go from 0% to 100% in 8 minutes.

Any smartphone compatible with the USB Power Delivery (USB-PD) protocol and equipped with a USB-C charger of at least 15W technically supports fast charging. Now standard fast charging allows the battery to go from 0% to 50% in less than 30 minutes.

In pursuit of fast charging methods, manufacturers like Xiaomi have used proprietary technology. For example, Xiaomi's HyperCharge feature increases voltage and current values ??for much faster 210W charging, in minutes.

Here's how 210W charging works and what charging speeds you should expect in practice, including whether charging that fast will reduce battery life.

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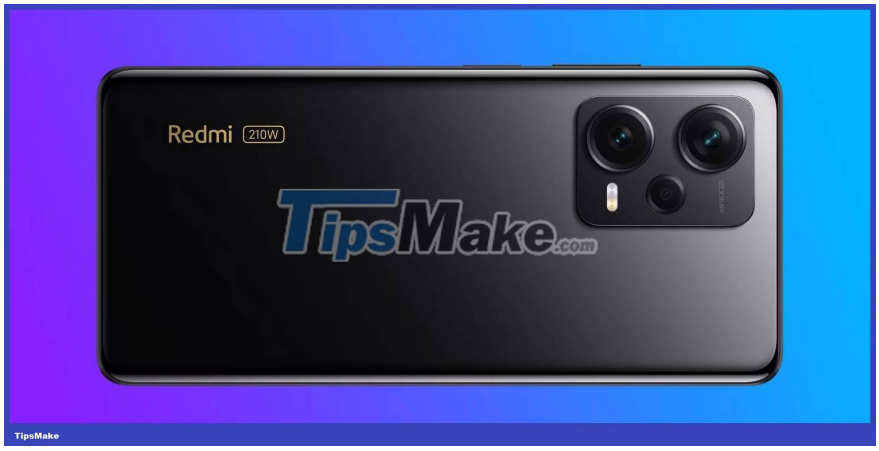
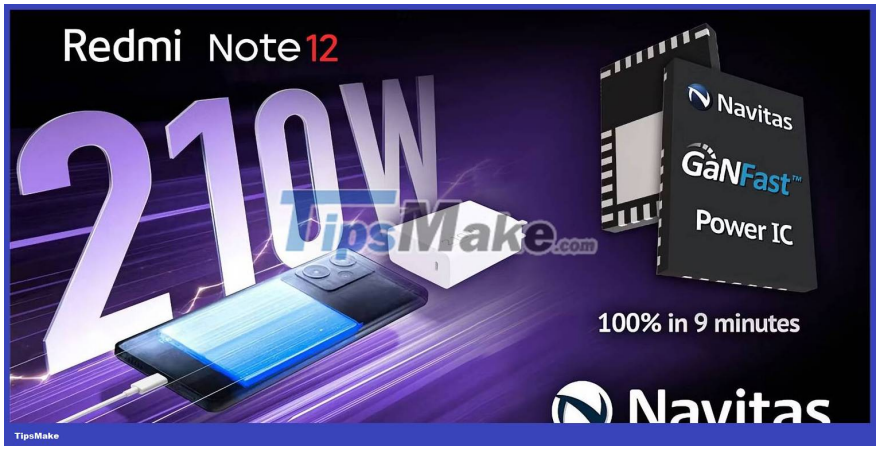


This technology allows the Note 12 Explorer from Redmi, a subsidiary of Xiaomi, to fully charge the 4300mAh battery in 9 minutes or up to 66% in just 5 minutes. For comparison, Xiaomi's previous 120W HyperCharge technology and Oppo's 150W SuperVOOC take about 15 minutes to recharge a 4,500mAh battery.

As if that wasn't enough, Xiaomi has upgraded itself with a preview of the 300W charging feature that completely replenishes the 4,100mah battery in less than 5 minutes, setting a new record.

Charging power, expressed in watts, is the product of voltage and current. The higher the voltage or current, the higher the charging capacity. To make 210W charging possible, reliable and safe, Xiaomi uses dual GaN chargers and three special 100W GaNFast chips from Navitas with over 50 safety features.



Specialized silicon provides protection against USB input overheating and overvoltage, etc. for both the charger and the phone. It monitors data from multiple sensors in the phone to maintain the battery's thermal performance within safe limits.

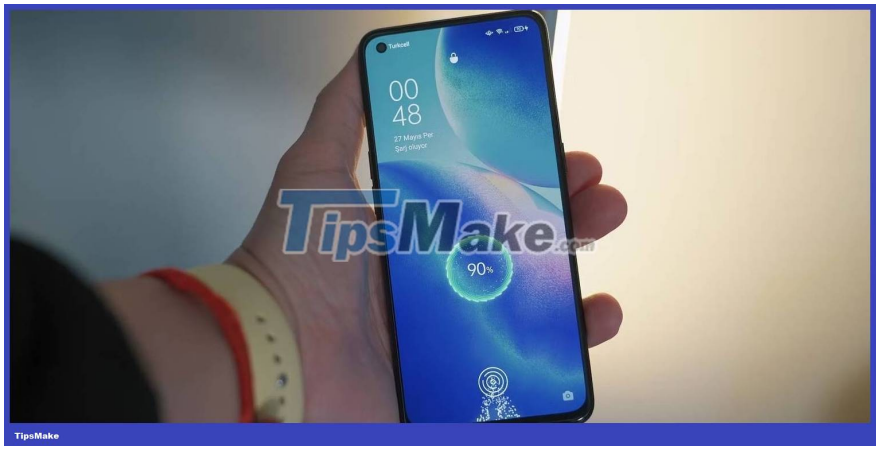
The 210W charger uses an improved electrolyte formula and battery materials such as graphene to have higher conductivity than traditional lithium-ion batteries. This enhances the efficiency of the electrodes while reducing their size, allowing the cells in between the thermal materials to quickly store and release electricity without wasting too much energy on heating.

Standard fast charging gradually reduces speed beyond the 80% mark, which is one of the ways to improve battery life. Xiaomi's own Mi-FC technology allows for greater capacity beyond the 80% mark. This method helps shorten the waiting time by 80% until the battery is fully charged.

At this point, you must be wondering how safe all of this is.

How does 210W charging affect battery life?

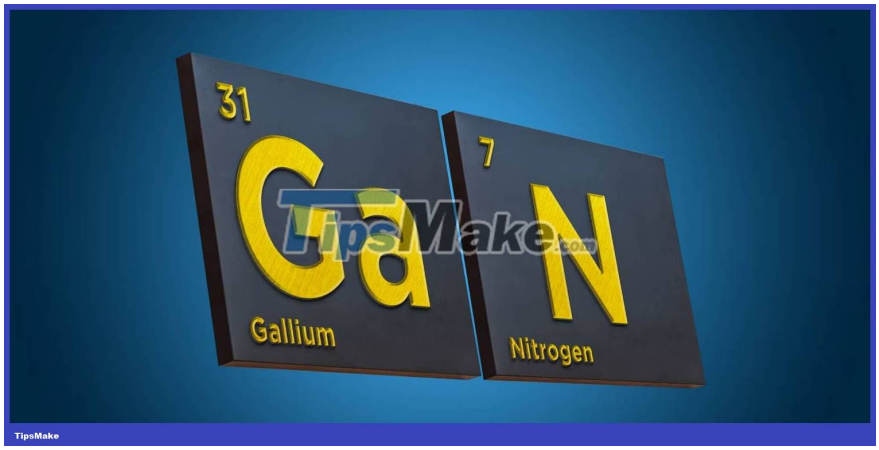
Will 210W charging drain battery capacity too quickly and significantly reduce lifespan? The short answer is probably no. Xiaomi's HyperCharge maintains up to 80% battery capacity after 1,000 charges, which is within the limits of any conventional battery.



According to a study conducted by ResearchGate, smartphone customers can expect their battery health to drop below 80% after approximately 500 to 1,000 full charge cycles.

For example, iPhone batteries are designed to maintain up to 80% capacity after 500 full charge and discharge cycles. Xiaomi says any battery will lose capacity by 20% within two years regardless of capacity. However, this claim remains unproven as these devices are still quite new. Unless you're really in a hurry, you should use slow charging to maximize battery life.

Actual charging speed expectations



There are many factors that affect real-world charging speeds. If the charger makes too much noise or the battery gets hot, charging speed will be affected. What phone manufacturers won't tell you is whether such fast charging will have a negative effect on battery life.

Tip : You may need to enable the Boost Mode option in the Battery section on Xiaomi to enable 210W charging initially.

On top of that, people cannot achieve the rated charging speed in actual use. By all accounts, you'll find charging is slower than in many of Xiaomi's tests done under ideal conditions. For example, the Redmi Note 12 Explorer Edition takes an average of 15 minutes from 0% to 100%. Factors that affect charging speed include battery life, room temperature, and even software updates. Meanwhile, Xiaomi is working to certify 300W charging.

After all, there are physical and chemical limits until increasing electrical capacity begins to harm the battery.

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