

Illustrative render generated from published specifications

18.33 × 64.85 mm
45 g

Samsung
INR18650-20R



Live page & updates

Samsung · released 2011

18650 NMC

2,000 mAh CAPACITY	22 A RATED CONTINUOUS	3.6 V NOMINAL · 2.5 – 4.2 V	7.2 Wh ENERGY · 160 WH/KG
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REFERENCE ONLY — NOT AN OFFICIAL DOCUMENT

This information is gathered from multiple sources, including manufacturer datasheets, independent third-party testing, and community contributions. Cell specifications vary between production batches and change over time, and no figure here is guaranteed to be correct or current. **Always consult the manufacturer's spec sheet directly.** Use this sheet for reference only — never as the sole basis for a safety-critical decision about charging, discharging, or assembling cells. The cell image is an illustrative render generated from published specifications, not a photograph.

CAPACITY AMONG 18650S #127 of 169 Lowest in databaseHighest Higher discharge than 92% of 18650 cells in our database. Great for high-drain builds.	VOLTAGE OPERATING WINDOW 1.7 V usable Cutoff 2.5 VNominal 3.6 VMax 4.2 V Below nominal the cell sags fast under load; above it, the last of the capacity fills slowly on the constant-voltage taper.
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APPLICATION SUITABILITY

Rule-of-thumb ratings from this cell's capacity and continuous discharge. Check your own load before committing.

Powerwalls	Usable for powerwalls but lower capacity means you'll need more cells to hit your target kWh.
Ebike packs	Marginal. Check your motor's peak draw first. You might get voltage sag under load.
Car audio	Enough discharge to handle amplifier bursts without voltage sag.
High-drain vaping	Below the 25A Mooch CDR threshold that high-drain vaping needs. Use a higher-drain cell.
Flashlights	Lower capacity means shorter runtime. Better cells are available for flashlight use.
Power tools	Sufficient discharge and capacity for most power tool packs.

IDENTITY

Manufacturer	Samsung
Model	INR18650-20R
Format	18650
Chemistry	NMC
Year released	2011
Wrap colour	Teal
Insulator	White
Terminal	Flat top
Protection	Unprotected

OPERATING TEMPERATURE

Charging	0°C to 50°C
Discharging	-20°C to 75°C

ENERGY & POWER DENSITY

Energy	7.2 Wh
Specific energy	160 Wh/kg
Volumetric density	420.73 Wh/L
Power density (mass)	1,760 W/kg
Power density (volume)	4,628 W/L
Capacity ranking	#127 of 169 18650s

PHYSICAL

Diameter	18.33 mm
Length	64.85 mm
Weight	45 g

ELECTRICAL

Rated capacity	2,000 mAh
Nominal voltage	3.6 V
Max charge voltage	4.2 V
Discharge cutoff	2.5 V
Energy	7.2 Wh
Internal resistance	18 mΩ
Max continuous discharge	22 A (datasheet)
Discharge C-rate	11C
Standard charge current	1,000 mA
Typical charge time	2 h
Standard discharge	400mA

C-RATE CONVERSION · 2,000 MAH

C-RATE	CURRENT	THEORETICAL RUNTIME
0.2C	0.4 A	5h 00m
0.5C	1 A	2h 00m
1C	2 A	1h 00m
2C	4 A	30m
3C	6 A	20m
5C	10 A	12m

8C	16 A	7m 30s
10C	20 A	6m

Highlighted row is closest to the rated 22 A continuous discharge.

CHARGING

RATE	CURRENT	ESTIMATED TIME TO FULL
0.5C	1,000 mA	~2h 00m
1C	2,000 mA	~1h 00m

Constant-current phase only. Real charge time runs longer because of the constant-voltage taper at the end.

SERIES PACK CONFIGURATIONS

Voltages calculated from this cell's own nominal and maximum charge voltage. The 3P columns show one common parallel count as a worked example — scale the parallel group to the capacity you need.

SERIES	NOMINAL	FULLY CHARGED	CELLS AT 3P	CAPACITY	ENERGY
3S	10.8 V	12.6 V	9	6 Ah	65 Wh
7S	25.2 V	29.4 V	21	6 Ah	151 Wh
10S	36 V	42 V	30	6 Ah	216 Wh
13S	46.8 V	54.6 V	39	6 Ah	281 Wh
14S	50.4 V	58.8 V	42	6 Ah	302 Wh

EXAMPLE PACKS

7S2P 24V ebike / small pack 14 cells · 25.2 V 4,000 mAh · 101 Wh 44 A max · ≈0.63 kg cells	13S4P 48V ebike standard 52 cells · 46.8 V 8,000 mAh · 374 Wh 88 A max · ≈2.34 kg cells	16S4P DIY powerwall 64 cells · 57.6 V 8,000 mAh · 461 Wh 88 A max · ≈2.88 kg cells	4S6P Power tool replacement 24 cells · 14.4 V 12,000 mAh · 173 Wh 132 A max · ≈1.08 kg cells
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SIMILAR CELLS

Same format and chemistry, within ± 500 mAh.

CELL	MAH	CONTINUOUS	WH	WEIGHT	WH/KG
Samsung INR18650-20R (this cell)	2,000	22 A	7.2	45 g	160
LG LGDBHE21865	2,500	20 A	9.3	48 g	193
Sanyo UR18650F	2,500	5 A	9.3	47 g	197
Sanyo UR18650FM	2,500	5 A	9.3	47 g	197
LG LGCP218650	2,500	—	9	—	—
LG LGDBHE41865	2,500	20 A	9	47 g	191

HANDLING & SAFETY

- Never charge above 4.2V or discharge below 2.5V.
- Store cells at around 3.6-3.8V (roughly 40-60% charge) for long-term storage.
- Don't mix cells with different capacities, chemistries, or states of charge in a pack.
- Inspect wraps before use. A torn wrap can cause a short circuit.
- Always use a BMS or balance charger appropriate for your pack configuration.
- Keep cells away from metal objects, keys, and coins. A short across the terminals can cause fire.

SOURCES & FURTHER READING

Cell Savors page	cellsaviors.com/cell-database/samsung-inr18650-20r
Manufacturer datasheet	https://docs.rs-online.com/84c8/0900766b812fdd47.pdf
Full cell database	cellsaviors.com/cell-database