

LED Resistor Calculator

Estimates the ideal current-limiting resistor for a series LED string and shows a rounded-up common-value candidate for component review.

Generated October 10, 2026

<https://www.elecatrix.com/circuits-components/led-resistor-calculator/>

Inputs		
Input	Value	Unit
Supply voltage	12	V
LED forward voltage	2	V
LED current	20	mA
LEDs in series	3	LEDs

Results		
Result	Value	Unit
Total LED forward voltage	6	V
Resistor voltage	6	V
Ideal resistor value	300	ohm
Resistor power	0.12	W
Rounded-up common resistor candidate	330	ohm

Calculation details		
Detail	Value	Unit
Calculation basis	Ideal series LED and resistor arithmetic using the entered forward-voltage, current, supply, and LED-count assumptions.	
Component boundary	No LED regulation, thermal, tolerance, pulse, supply-variation, resistor-wattage, manufacturer, listing, or safety result is included.	

Formulas		
Total LED forward voltage = LED forward voltage x series LED count		
Resistor voltage = supply voltage - total LED forward voltage		

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$$I_A = \frac{I_{mA1000}}{1000}$$

$$R = \frac{\text{resistor voltage}}{I_A}$$

$$P_R = \text{resistor voltage} \times I_A$$

Rounded-up common resistor candidate = first standard resistance value at or above the ideal resistance

Warnings and limitations

This LED resistor estimate uses entered forward voltage and current assumptions. It does not model current regulation, LED temperature, tolerance, pulse behavior, supply variation, thermal limits, or product safety.