PV Modules on a Roof: Layout Count and Capacity

Number of PV modules that fit on a rectangular roof plane in portrait and landscape with edge setbacks and gaps, the installed capacity and the roof coverage.

Method: Module layout arithmetic

Input parameters

Unit system: SI

Parameter	Value	Unit
Roof length along the eaves	12.000	m
Roof width up the slope	6.0000	m
Edge setback (fire and wind zone)	0.50000	m
Module length	1.7220	m
Module width	1.1340	m
Gap between modules	20.000	mm
Module rating	0.41000	kW

Calculated results

Parameter	Value	Unit
Modules in portrait	18.000	
Modules in landscape	24.000	
Best count	24.000	
Installed capacity (best layout)	9.8400	kW
Module area over roof area	65.092	%
Capacity per m² of roof (W)	136.67	

Notes for this case

• Rectangular grid inside the setbacks: portrait puts the module length up the slope. Obstructions (vents, chimneys, skylights), shading and structural limits reduce the count; check local fire-access rules for setbacks.

Formula and method

$$n_P = \left\lfloor \frac{L - 2s + g}{b + g} \right\rfloor \left\lfloor \frac{W - 2s + g}{a + g} \right\rfloor, \quad P = n P_m$$

Variables

L	Roof length along the eaves	m
W	Roof width up the slope	m
s	Edge setback (fire and wind zone)	m
a	Module length	m
b	Module width	m
g	Gap between modules	m
P_m	Module rating	W
n_P	Modules in portrait	-
n_L	Modules in landscape	-
n	Best count	-
P	Installed capacity (best layout)	W

A_m / A_{roof}	Module area over roof area	-
P / A_{roof}	Capacity per m² of roof (W)	-

Method and standards

Roof layout count.

Assumptions and limits

- Rectangular unobstructed roof plane.

References

Module layout arithmetic

Report details

Report reference	FCC-NN28-N5JF (the same inputs always give the same reference)
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Calculator	PV Modules on a Roof: Layout Count and Capacity
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/solar-pv/pv-roof-module-layout

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.