Decibel Calculator: Power, Voltage and Current Ratios

Gain or loss in decibels from power or voltage ratios and back, with dBm and dBV levels, for signals, amplifiers, filters and cable losses.

Method: Definition of the decibel (IEC 60027-3)

Input parameters

Unit system: SI

Parameter	Value	Unit
Reference value (power or voltage)	1.0000	
Measured value	0.50000	
The values are	Voltages or currents (20 log)	
Gain to convert to a ratio (dB)	-6.0000	

Calculated results

Parameter	Value	Unit
Gain in dB	-6.0206	
Power ratio for the dB entered	0.25119	
Voltage ratio for the dB entered	0.50119	

Notes for this case

- Voltage ratios use 20 log only when both voltages are across the same impedance.

Formula and method

$$G = 10 \log_{10} \frac{P_2}{P_1} = 20 \log_{10} \frac{V_2}{V_1}$$

Variables

X_1	Reference value (power or voltage)	-
X_2	Measured value	-
kind	The values are	-
G	Gain to convert to a ratio (dB)	-
G_{12}	Gain in dB	-
P_2/P_1	Power ratio for the dB entered	-
V_2/V_1	Voltage ratio for the dB entered	-

Method and standards

Definition of the decibel.

Assumptions and limits

- Equal impedances for voltage ratios.

References

- Definition of the decibel (IEC 60027-3)

Report details

Report reference	FCC-537R-ECQC (the same inputs always give the same reference)
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Calculator	Decibel Calculator: Power, Voltage and Current Ratios
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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/instrumentation/signals-calibration/decibel-conversion

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.