

Application Note 032 - Power Conversion Table

This document provides convenient conversion power and signal voltage.

dBm	V _{rms}	V _{pk-pk} (single tone)	dBμV	W
-150	7.07 nV	20.00 nV	-43.0	1.00 aW
-145	12.60 nV	35.60 nV	-38.0	3.16 aW
-140	22.40 nV	63.20 nV	-33.0	10.00 aW
-135	39.80 nV	112.00 nV	-28.0	31.60 aW
-130	70.70 nV	200.00 nV	-23.0	100.00 aW
-125	126.00 nV	356.00 nV	-18.0	316.00 aW
-120	224.00 nV	632.00 nV	-13.0	1.00 fW
-115	398.00 nV	1.12 μV	-8.0	3.16 fW
-110	707.00 nV	2.00 μV	-3.0	10.00 fW
-105	1.26 μV	3.56 μV	2.0	31.60 fW
-100	2.24 μV	6.32 μV	7.0	100.00 fW
-95	3.98 μV	11.20 μV	12.0	316.00 fW
-90	7.07 μV	20.00 μV	17.0	1.00 pW
-85	12.60 μV	35.60 μV	22.0	3.16 pW
-80	22.40 μV	63.20 μV	27.0	10.00 pW
-75	39.80 μV	112.00 μV	32.0	31.60 pW
-70	70.70 μV	200.00 μV	37.0	100.00 pW
-65	126.00 μV	356.00 μV	42.0	316.00 pW
-60	224.00 μV	632.00 μV	47.0	1.00 nW
-55	398.00 μV	1.12 mV	52.0	3.16 nW
-50	707.00 μV	2.00 mV	57.0	10.00 nW
-45	1.26 mV	3.56 mV	62.0	31.60 nW
-40	2.24 mV	6.32 mV	67.0	100.00 nW
-35	3.98 mV	11.20 mV	72.0	316.00 nW
-30	7.07 mV	20.00 mV	77.0	1.00 μW
-25	12.60 mV	35.60 mV	82.0	3.16 μW
-20	22.40 mV	63.20 mV	87.0	10.00 μW
-15	39.80 mV	112.00 mV	92.0	31.60 μW
-10	70.70 mV	200.00 mV	97.0	100.00 μW
-5	126.00 mV	356.00 mV	102.0	316.00 μW
0	224.00 mV	632.00 mV	107.0	1.00 mW
5	398.00 mV	1.12 V	112.0	3.16 mW
10	707.00 mV	2.00 V	117.0	10.00 mW
15	1.26 V	3.56 V	122.0	31.60 mW
20	2.24 V	6.32 V	127.0	100.00 mW
25	3.98 V	11.20 V	132.0	316.00 mW
30	7.07 V	20.00 V	137.0	1.00 W
35	12.60 V	35.60 V	142.0	3.16 W
40	22.40 V	63.20 V	147.0	10.00 W
45	39.80 V	112.00 V	152.0	31.60 W
50	70.70 V	200.00 V	157.0	100.00 W
55	126.00 V	356.00 V	162.0	316.00 W
60	224.00 V	632.00 V	167.0	1.00 kW

Unit prefixes:-

k = kilo = 10³
 m = milli = 10⁻³
 μ = micro = 10⁻⁶
 n = nano = 10⁻⁹

p = pico = 10⁻¹²
 f = femto = 10⁻¹⁵
 a = atto = 10⁻¹⁸

Note:- data presented assumes a system with 50Ω characteristic impedance.

Useful Formulae

Decibel Power Conversion

$$\text{dB} = 10\log_{10}[P2/P1]$$

Decibel Microamp Conversion

$$\text{dB}\mu\text{A} = 20\log[\text{Signal}(\mu\text{A})/1\mu]$$

decibel relative to one microamp

Decibel Milliwatt (mW) Conversion

$$\text{dBm} = 10\log_{10}[\text{Signal}(\text{mW})/1\text{mW}]$$

(decibel relative to one milliwatt)

dBW to dBm Power Conversion

$$\text{dBm} = \text{dBW} + 30$$

decibel relative to one watt

Milliwatts Decibel Conversion

$$\text{mW} = 10^{(\text{dBm}/10)}$$

dB μ V to dBm Voltage to Power Conversion

$$\text{dBm} = \text{dB}\mu\text{V} - 107$$

decibel relative to one microvolt

Decibel Voltage (V) Conversion

$$\text{dB} = 20\log[V1/V2]$$

decibel relative to one volt

dBV to dB μ V Voltage Conversion

$$\text{dB}\mu\text{V} = \text{dBV} + 120$$

decibel relative to one volt

Decibel Microvolt Conversion

$$\text{dB}\mu\text{V} = 20\log[\text{Signal}(\mu\text{V})/1\mu\text{V}]$$

decibel relative to one microvolt

$$\text{mW} = 20 \times V_{\text{rms}}^2$$

Decibel Current (I) Conversion

$$\text{dB} = 20\log[I1/I2]$$

decibel relative to one amp