CAUTION

HIGH VOLTAGE

TEST IN PROGRESS

DO NOT DISTURB

HV TECHNOLOGIES, Inc.

+1-703-365-2330
www.hvtechnologies.com
Manassas, VA USA

Standard Unit Prefixes

Factor	Name	Pre-fix
1,000,000,000,000,000,000,000,000 = 10^{24}	yotta	Y
1,000,000,000,000,000,000,000 = 10^{21}	zetta	Z
1,000,000,000,000,000,000 10^{18}	exa	E
1,000,000,000,000,000 = 10^{15}	peta	P
1,000,000,000,000 = 10^{12}	tera	T
1,000,000,000 = 10^{9}	giga	G
1,000,000 = 10^{6}	mega	M
1,000 = 10^{3}	kilo	k
100 = 10^{2}	hecto	h
0.01 = 10^{-2}	centi	c
0.001 = 10^{-3}	milli	m
0.000001 = 10^{-6}	micro	µ
0.000000001 = 10^{-9}	nano	n
0.000000000001 = 10^{-12}	pico	p
0.000000000000001 = 10^{-15}	femto	f
0.000000000000000001 = 10^{-18}	atto	a
0.000000000000000000001 = 10^{-21}	zepto	z
0.000000000000000000000001 = 10^{-24}	yocto	y

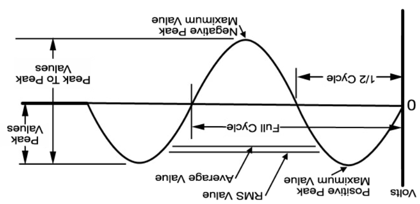
Voltage Levels for a Sine Wave

$$Volts_{peak} = \sqrt{2} \bullet Volts_{rms} = \frac{\pi}{2} \bullet Volts_{Avg}$$

$$Volts_{rms} = \frac{Volts_{peak}}{\sqrt{2}} = \frac{\pi}{2 \bullet \sqrt{2}} \bullet Volts_{Avg}$$

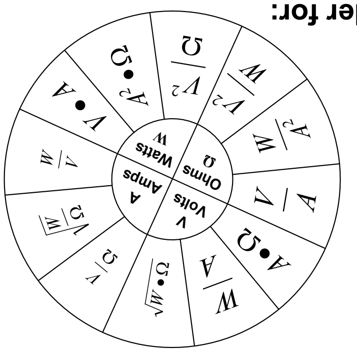
$$Volts_{avg} = \frac{2}{\pi} \bullet Volts_{peak} = \frac{2 \bullet \sqrt{2}}{\pi} \bullet Volts_{Avg}$$

$$Volts_{peak-peak} = 2 \bullet Volts_{peak}$$



Useful Conversions

1 in = 0.0254 m
1 ft = 0.3048 m
1 yd = 0.9144 m
1 in^2 = 0.00064516 m^2
1 ft^2 = 0.092903 m^2
1 yd^2 = 0.83612736 m^2
1 in^3 = 0.000016387064 m^3
1 ft^3 = 0.028316846 m^3
1 yd^3 = 0.764554858 m^3
1 lb = 0.45359237 kg
1 psi. = 6,894.7573 Pa (Pascal)
1 hp = 550 ftlb/sec
= 745.6999 Watts
°C = (°F-32)/1.8
°F = (°C•1.8)+32



Exclusive North American Sales and Service Provider for:

EMC - PARTNER
Impulse Generators
ESD, EFT, Surge, Ring, DOW
MIL-STD, DO160, ISO, IEC, ...

PRÂNA
Amplifiers
Solid-State Class A
10 kHz - 6 GHz

GAUSS INSTRUMENTS
EMI Receivers
FFT Real time 325MHz
Fastest, best noise floor

montena
MIL-STD Systems
RS105 NEMP, PCI EMP
300kV ESD, ...

INNCO systems
Positioners
Turntables
Antenna Masts

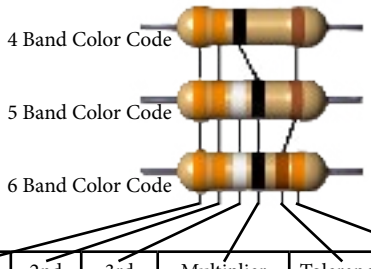
PONTIS EMC PRODUCTS
Cameras
Fiber optic: CANbus,
USB, Ethernet,...

HV TECHNOLOGIES, Inc.
www.hvtechnologies.com
+1-703-365-2330

Pulse Parameters Quick Reference

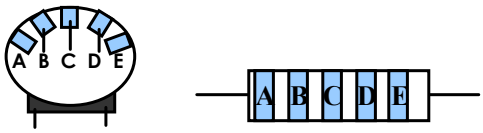
Standard	Name	Rise			Measure	Duration			Measure	Reputation	Levels	
IEC 61000-4-2	ESD	0.8	ns	±25%	10 to 90 %	NA	ns			1 s	±2, 4, 6, 8 kV Air ±2, 4, 8, 15 kV Contact	±5%
IEC 61000-4-4	EFT/Burst 50 Ω	5	ns	±30%	10 to 90 %	50	ns	±30%	50 to 50 %	5 or 100 kHz ±20%	±0.125, 0.25, 0.5, 1, 2 kV	±10%
	EFT/Burst 1 kΩ	5	ns	±30%	10 to 90 %	50	ns	+100ns -15ns	50 to 50 %		±0.25, 0.5, 1, 2, 4 kV	±20%
IEC 61000-4-5	Surge Open 1.2/50	1	µs	±30%	10 to 90 %	50	µs	±20%	50 to 50 %	≤ 1m	±0.5, 1, 2, 4 kV	±10%
	Surge Short 8/20	6.4	µs	±20%	10 to 90 %	16	µs	±20%	50 to 50 %		±0.25, 0.5, 1, 2 kA	±10%
	Telecom Open 10/700	6.5	µs	±30%	10 to 90 %	700	µs	±20%	50 to 50 %	≤ 1m	±0.5, 1, 2, 4 kV	±10%
	Telecom Short	4	µs	±20%	10 to 90 %	300	µs	±20%	50 to 50 %		±12.5, 25, 50, 100 A	±10%
IEC 61000-4-9	Magnetic Surge	6.4	µs	±30%	10 to 90 %	16	µs	±20%	50 to 50 %	≥ 10s	±100, 300, 1000 A/m	±10%
IEC 61000-4-10	Magnetic DOW	100	kHz	±10%		Pk5 > 50 %, Pk 10 < 50 %				40Hz for ≥ 2sec	±10, 30, 100 A/m	±10%
		1	MHz	±10%		Pk5 > 50 %, Pk 10 < 50 %				400Hz for ≥ 2sec	±10, 30, 100 A/m	±10%
IEC 61000-4-11	Voltage dips/interrupt	Fall and rise times between 1 - 5 µs										
IEC 61000-4-12	Ring Wave Open	0.5	µs	±30%	10 to 90 %	100	kHz	±10%		1 - 60 per minute	±0.25, 0.5, 1, 2, 4 kV	±10%
	Ring Wave Short	1	µs	≤	10 to 90 %	100	kHz	±10%			±333A@12Ω, 133A@30 Ω	±10%
IEC 61000-4-18	DOW 100 kHz	75	ns	±20%	10 to 90 %	Pk5 > 50 %, Pk 10 < 50 %				40Hz for ≥ 2sec	±0.25, 0.5. 1, 2 kV	±10%
	DOW 1 MHz	75	ns	±20%	10 to 90 %	Pk5 > 50 %, Pk 10 < 50 %				400Hz for ≥ 2sec	±0.25, 0.5. 1, 2 kV	±10%
	DOW 3 MHz	5	ns	±30%	10 to 90 %	Pk5 > 50 %, Pk 10 < 50 %				5 k/s ±10%	±0.5, 1, 2, 4 kV	±10%
	DOW 10 MHz	5	ns	±30%	10 to 90 %	Pk5 > 50 %, Pk 10 < 50 %				5 k/s ±10%	±0.5, 1, 2, 4 kV	±10%
	DOW 30 MHz	5	ns	±30%	10 to 90 %	Pk5 > 50 %, Pk 10 < 50 %				5 k/s ±10%	±0.5, 1, 2, 4 kV	±10%
MIL-STD-461F	CS106	1.5	µs	±0.5µs	0 to 100 %	5	µs	±22%	0 to 0 V	5 - 10/s	400V	≥
	CS115	2	ns	≤	10 to 90 %	30	ns	≥	90 to 90 %	30 Hz	5 amps	≥
	CS116	0.01, 0.1, 1, 10, 30, 100 MHz								Q=15 ±5, f=Freq (Hz), t=Time (sec)		
RTCA-DO160	SEC 17 Voltage Spike	2	µs	≤	0 to 100 %	10	µs	≥	0 to 0 V	50/min	±600V or 2 x Line Voltage	≥
	SEC 19	Unsuppressed Relay switching								0.2 to 10 µs	±600V	≥
	SEC 22 WF1	6.4	µs	±20%	0 to 100 %	69	µs	±20%	0 to 50 %		±Current	
	SEC 22 WF2	100	ns	≤	0 to 100 %	6.4	µs	±20%	0 to 50 %		±Voltage	
	SEC 22 WF3	1	MHz	±10%		Pk5 25 to 75% of largest peak					±Current or Voltage	
		10	MHz	±10%		Pk5 25 to 75% of largest peak					±Current or Voltage	
	SEC 22 WF4	6.4	µs	±20%	0 to 100 %	69	µs	±20%	0 to 50 %		±Voltage	
	SEC 22 WF5A	40	µs	±20%	0 to 100 %	120	µs	±20%	0 to 50 %		±Current or Voltage	
	SEC 22 WF5B	50	µs	±20%	0 to 100 %	500	µs	±20%	0 to 50 %		±Current or Voltage	
	SEC 22 WF6H	244	ns	±20%	0 to 100 %	4	µs	±20%	0 to 50 %		±Voltage	

Resistor Color Code



1st Digit	2nd Digit	3rd Digit	Multiplier	Tolerance	Temp. Coeff.
			0.01 (Silver)	±10%	
			0.1 (Gold)	±5%	
0	0	0	1		
1	1	1	10	±1%	100ppm
2	2	2	100	±2%	50ppm
3	3	3	1k		15ppm
4	4	4	10k		25ppm
5	5	5	100k	±0.5%	
6	6	6	1M	±0.25%	
7	7	7	10M	±0.1%	
8	8	8			
9	9	9			

Capacitor Color Code



A. Temp. Coeff. ppm/°C	B. 1st Digit	C. 2nd Digit	D. Multiplier	E. Tolerance >10pf	E. Tolerance <10pf
+100 JAN(Silver)					
Bypass/Couple(Gold)					
0	0	0	1	±20%	±2.0pf
-30	1	1	10	±1%	
-80	2	2	100	±2%	
-150	3	3	1k		
-220	4	4	10k		
-330	5	5		±5%	±0.5pf
-470	6	6			
-750	7	7			
+30	8	8	0.01		±0.25pf
+120 to -750 EIA +500 to -330 JAN	9	9	0.1	±10%	±1.0pf