

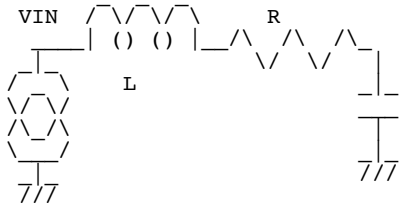
Need_For_Short_Leads

* dsauersanjose@aol.com 8/15/08

* www.idea2ic.com

* http://www.idea2ic.com/PlayWithJavascript/Calc_Inductor_Loop.html

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$L_H = Num^2 * R * uo * (\ln(8 * R / a) - 2.0)$
For a 1mm radius single wire loop

R	Inductance
1cm	30nH
3mm	0.1nH

```
IIN      VIN      0      DC      0 AC 1
L        VIN      VR      30n
R        VR       VC      1m
RP       VIN      0      1MEG
C        VC       0      .1u
```

.control

```
ac dec 100 10k 100Meg
plot mag(vin) loglog title 30nH
```

```
alter L inductance = .1n
ac dec 100 10k 100Meg
plot mag(vin) loglog title 0.1nH
```

.endc

.end

=====END_OF_SPICE=====

Is that capacitor stabilizing the output of your power amplifier really a capacitor? If your not carefull in your PC board layout, you may actually be stablizing your output stage with and inductor.

NumberTurns
 Mu_r Air =1
 Coil Radius centimeters
 Wire Radius millimeters
 nanoHenry

inductance for Loop..

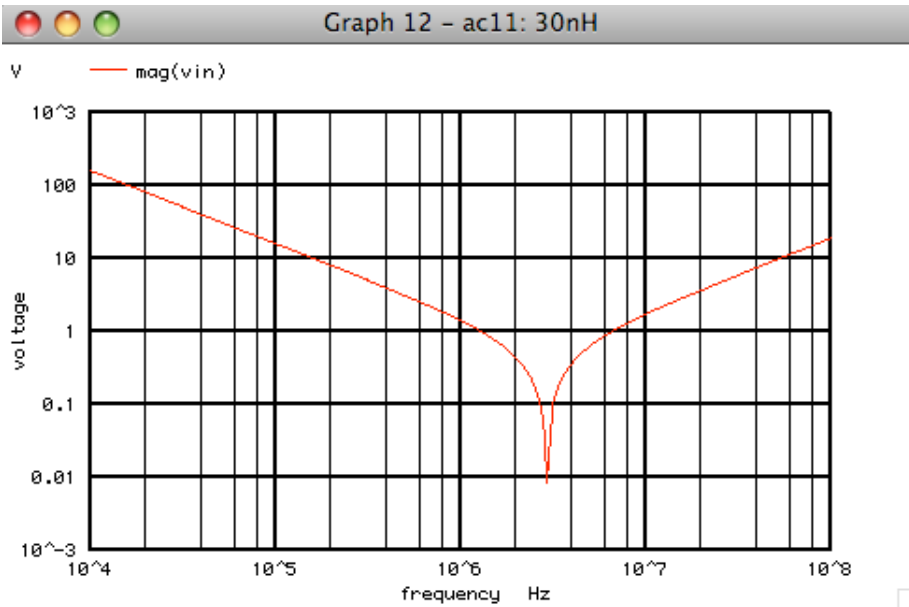


$$L_H = \text{Num}^2 * R_m * \mu_r * \mu_0 * (\ln(8 * R_m / a_m) - 2.0)$$

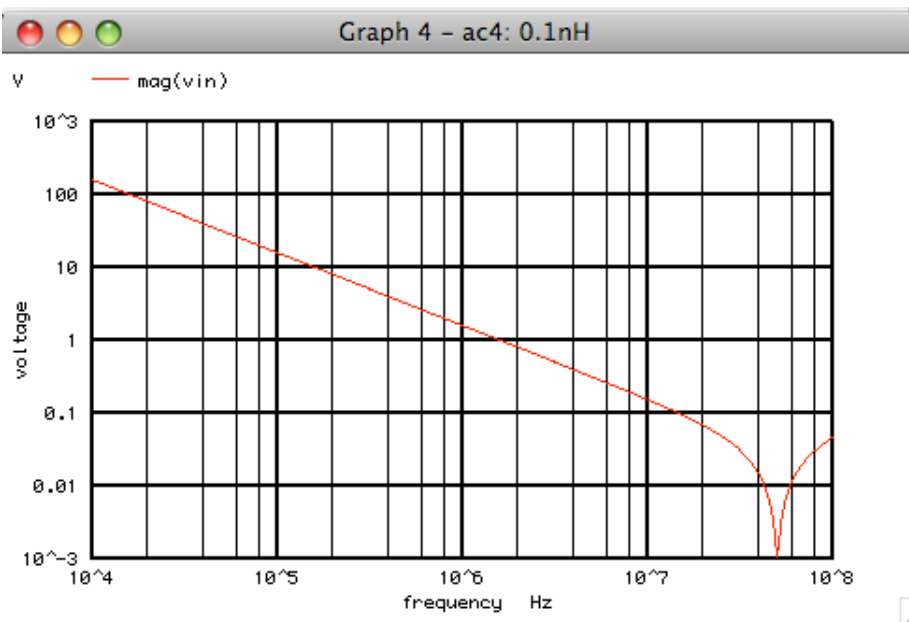
$$\mu_0 = 4 * \pi * 1E-7 \text{ H/m}$$

The javascript calculator used to find inductance is given below.

http://www.idea2ic.com/PlayWithJavascript/Calc_Inductor_Loop.html



The above javascript will show that if the short lead rule is not applied, it is not a capacitor but rather an inductor above a few MegHz. In the case of the LM383, things start to get unstable at 120nH of stray inductance.



Making leads as small as possible can greatly reduce the stray inductance. Current flows in loops and inductance is just how much of a magnetic field a loop of wire can produce. Above a few hundred megHz, components need now to be understood in terms of maxwell's equations.

***#1=====WinSpiceVersion=====**

Need_For_Short_Leads

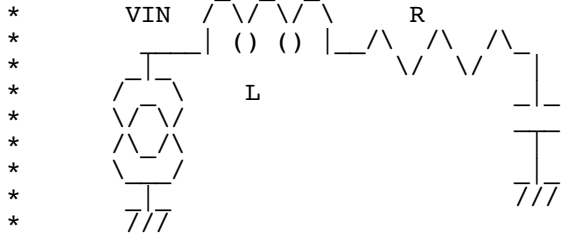
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$L_H = \text{Num}^2 * R * \mu_0 * (\ln(8 * R / a) - 2.0)$
For a 1mm radius single wire loop

W	L	Inductance
1cm	1cm	30nH
3mm	3mm	0.26nH

```
IIN      VIN      0      DC      0 AC 1
L        VIN      VR      30n
R        VR       VC      1m
RP       VIN      0       1MEG
C        VC       0       .1u
```

```
.control
ac dec 100 10k 100Meg
plot      mag(vin) loglog title 30nH

alter L  inductance = .26n
ac dec 100 10k 100Meg
plot      mag(vin) loglog title 0.26nH

.endc
.end
```