

TI LDC Inductance Calculator

Estimator tool for racetrack spiral coils. This tool is provided without warranty or support. User assum

[Take a look at this blog post for additional information](#)



Enter only in Yellow Fields (pull-down for mm or mil)
Results in Orange Fields



← Double-Click

LC Sensor calculations			
LDC Device		LDC1612/4	
Operating temperature	T	25	°C
Sensor capacitance	C	110.0	pF
Layers	M	2	Layers
Turns (per layer)	N	13	Turns
Short Side of inductor	d_{OUT}	20.00	mm
Sensor Shape		Racetrack	
Long side of inductor	d_L	40.00	mm
spacing between traces	S	0.200	mm
width of trace	w	0.400	mm
PCB thickness between 1st layer and 2nd layer	h_{12}	1.000	mm
PCB thickness between 2nd layer and 3rd layer	h_{23}	30.000	mm
PCB thickness between 3rd layer and 4th layer	h_{34}	8.000	mm
PCB thickness between 4th layer and 5th layer	h_{45}	8.000	mm
PCB thickness between 5th layer and 6th layer	h_{56}	8.000	mm
PCB thickness between 6th layer and 7th layer	h_{67}	1.575	mm
PCB thickness between 7th layer and 8th layer	h_{78}	1.575	mm
Copper thickness	t	1.000	oz-Cu
Conductor Resistivity (at 20°C)	ρ_r	1.68E-08	Ωm
Conductor Resistivity temperature coef	ρ_{r_tc}	0.393	%/°C
Conductor relative permeability	μ_r	1.00	
Parasitic capacitance	C_{par}	4.0	pF
Copper resistivity at operating temperature	ρ_{r_t}	1.713E-08	Ωm
Coil Fill Ratio	d_{in}/d_{out}	0.21	
Inductor inner diameter	d_{in}	4.200	mm
Self inductance per layer	L	4.123	μH
Total Inductance with no target	L_{TOTAL}	12.974	μH

Sensor Operating Frequency no target	f_{RES}	4.138	MHz
Rp with no Target	R_p	28.79	kΩ
Q factor	Q	82.33	
Self resonant frequency (estimated)	SRF	22.093	MHz
Target Distance	D	3.000	mm
Sensor Inductance from Target Interaction	L'	12.598	μH
Sensor Frequency with Target Interaction	f_{RES}'	4.200	MHz
Rp with Target Interaction	R_p'	27.86	kΩ
Q Factor with target	Q'	82.3	

OneUI Application

MENU Sensing Solutions EVM GUI v1.10.0

Sensor Properties and Input Adjustments

Sensor Properties and Input Adjustments

Channel	Input Adjustments	Sensor Filter Bank		Measured Sensor Data					Calculated Sensor Data		
	F _{int} Select	Series Inductance (uH)	Parallel Capacitance (pF)	Raw Code	Saturated	Watchdog Timeout Error	Amplitude Warning	Input Deglitch Filter Incorrect	Frequency (MHz)	Total Inductance (uH)	Sensor Inductance (uH)
0	1	0	330	20280465	●	●	●	●	3.022028	8.404839	8.404839
1	2	0	110	50260801	●	●	●	●	3.057957	24.625487	24.625487

Input Deglitch Filter
 Select the lowest setting that exceeds the oscillation tank oscillation frequency.

1 MHz
 3.3 MHz
 10 MHz
 33 MHz

Registers update rate (100ms minimum, use Data Streaming page for faster rates): ms.

Measurement Settings

Connected | SSP EVM connected - LDC1612

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Registers update rate (100ms minimum, use Data Streaming page for faster rates): ms

Measurement Settings

Channel Sequencing Mode
 Repeat single channel measurement
 Sequence channel measurements

Reference Clock Source
 Internal Oscillator (43.4 MHz Typical)
 External Oscillator MHz

Total Device Sampling Time
 Sampling Time: 26.625 ms
 Samples/Second/Channel: 37.559

Measurement Timings

Channel	Enable	F _{int}		Settle Count		Reference Count		Timing		ENOB _{max}
		Divider Code	Calculated (MHz)	Code	Time (us)	Code	Time (us)	Switching (us)	Sampling (us)	
0	<input checked="" type="checkbox"/>	1	40.000	1024	409.80	65535	26214.10	0.81600	26624.52	21.0
1	<input checked="" type="checkbox"/>	1	40.000	1024	409.80	65535	26214.10	0.81600	26624.52	21.0

Current Drive and Power

Power Mode

Enable Low Power Sensor Activation Mode (Recommended)
 Enable High Current Sensor Drive (ch0 only)
 Enable Sleep Mode

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Sensor Initialization Current

Channel	I _{ave}		Detect I _{ave} limit	
	Code	Current (uA)	Code	Current (uA)
0	17	196	17	196
1	26	1006	17	196

Device Status

Error Channel: 1

- Conversion Under-range Error
- Conversion Over-range Error
- Watchdog Timeout Error
- Amplitude High Warning
- Amplitude Low Warning

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