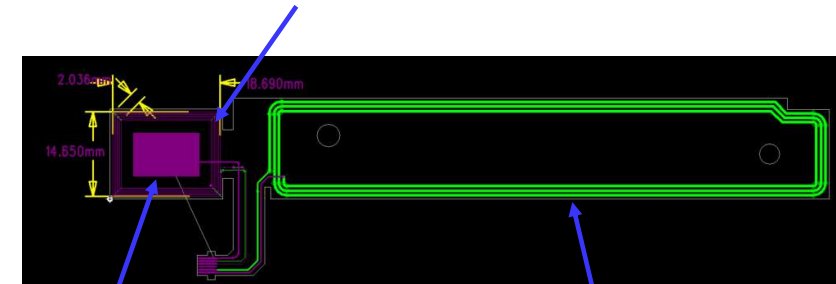


LC Sensor calculations				
LDC Device		LDC3114		
Operating temperature	T	25	°C	Enter operating temperature
Sensor capacitance	C	100.0	pF	Select LC tank capacitance
Layers	M	2	Layers	Number of layers on PCB board ( $1 \leq M \leq 8$ )
Turns (per layer)	N	7	Turns	Number of turns per layer
Short Side of inductor	d <sub>OUT</sub>	14.65	mm	Outer Diameter of the spiral inductor
Sensor Shape		Racetrack		
Long side of inductor	d <sub>L</sub>	18.69	mm	
spacing between traces	S	0.120	mm	Space between traces (mm or mil)
width of trace	w	0.120	mm	Width of the trace (mm or mil)
PCB thickness between 1st layer and 2nd layer	h12	0.450	mm	Space between layer 1 and 2 (mm or mil)
PCB thickness between 2nd layer and 3rd layer	h23	30.000	mm	Space between layer 2 and 3 (mm or mil)
PCB thickness between 3rd layer and 4th layer	h34	8.000	mm	Space between layer 3 and 4 (mm or mil)
PCB thickness between 4th layer and 5th layer	h45	8.000	mm	Space between layer 4 and 5 (mm or mil)
PCB thickness between 5th layer and 6th layer	h56	8.000	mm	Space between layer 5 and 6 (mm or mil)
PCB thickness between 6th layer and 7th layer	h67	1.575	mm	Space between layer 6 and 7 (mm or mil)
PCB thickness between 7th layer and 8th layer	h78	1.575	mm	Space between layer 7 and 8 (mm or mil)
Copper thickness	t	0.500	oz-Cu	Copper layer thickness (mm,Oz-Cu, or mil)
Conductor Resistivity (at 20°C)	pr	1.68E-08	Ωm	Use 1.68e-08 for Copper
Conductor Resistivity temperature coef	pr_tc	0.393	%/°C	Use 0.393 for Copper
Conductor relative permeability	μ <sub>r</sub>	1.00		Use 1.0 for Copper
Parasitic capacitance	Cpar	4.0	pF	Estimate - generally in the rage of 1 to 5 pf
Copper resistivity at operating temperature	pr_t	1.713E-08	Ωm	
Coil Fill Ratio	din/dout	0.77		0.2 > din/dout > 0.8 is recommended for highest Q
Inductor Inner diameter	din	11.290	mm	Inner diameter of the spiral inductor (mm or mil)
Self inductance per layer	L	1.590	μH	
Total Inductance with no target	L <sub>TOTAL</sub>	4.847	μH	
Sensor Operating Frequency no target	f <sub>RES</sub>	7.088	MHz	
Rp with no Target	R <sub>p</sub>	6.18	kΩ	
Q factor	Q	27.51		
Self resonant frequency (estimated)	SRF	36.144	MHz	SRF should be > 1.25*Fsensor
Target Distance	D	5.000	mm	For aluminum target of at least 5 skin depths
Sensor Inductance from Target Interaction	L'	4.819	μH	
Sensor Frequency with Target Interaction	f <sub>RES</sub> '	7.109	MHz	
Rp with Target Interaction	R <sub>p</sub> '	6.14	kΩ	
Q Factor with target	Q'	28.0		

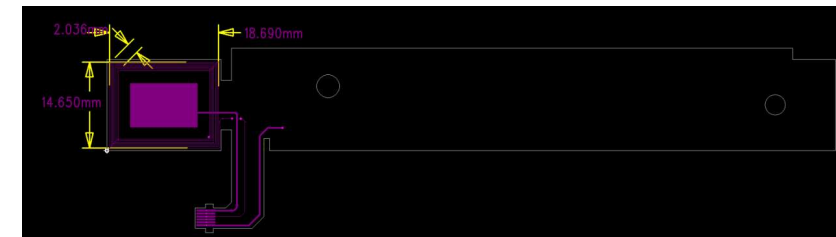
## INDUCTIVE SENSOR COIL



## CAPACITIVE SENSOR PAD

## NFC COIL

## Layer 1



## Layer 2

