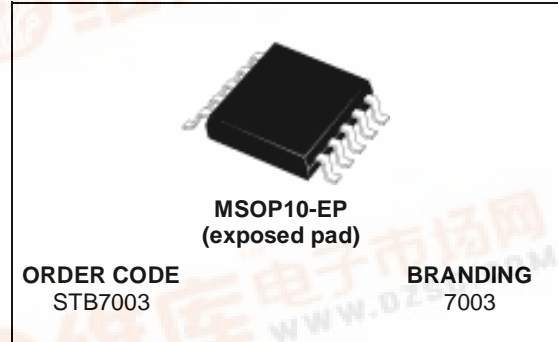




STB7003

TRI-BAND GSM/DCS/PCS LNA

- SUPPLY VOLTAGE 2.8V
- LOW CURRENT CONSUMPTION
- VERY LOW NOISE FIGURE:
 - NF=1.5dB @ 950MHz
 - NF=1.9dB @ 1850MHz
 - NF=2dB @ 1950MHz
- DIGITAL GAIN CONTROL



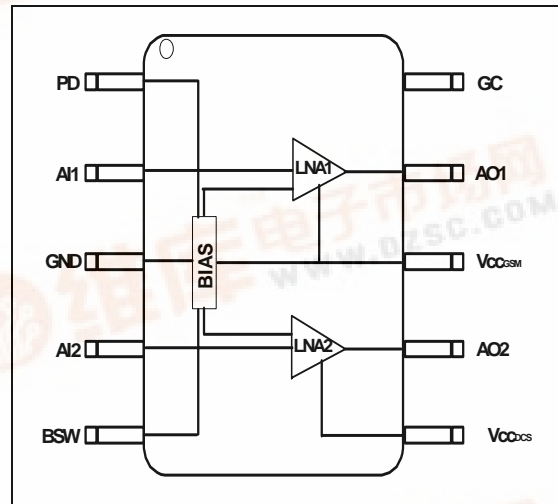
APPLICATIONS

TRI-BAND GSM/DCS/PCS FRONT-ENDS

DESCRIPTION

The STB7003 is a tri-band LNA designed for GSM/DCS/PCS applications. The GC pin sets the LNA gain levels. The innovative architecture implemented allows to reach very low current consumption. LNA1 works at 0.9-1.0 GHz and LNA2 over the 1.8-2GHz frequency range.

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATING

Symbol	Parameter	Value	Unit
Vcc	Supply voltage	4.5	V
Tj	Junction temperature	150	°C
Tstg	Storage temperature	-40 to +85	°C

THERMAL DATA

Symbol	Parameter	Value	Unit
R _{th(j-a)}	Thermal resistance junction-ambient	TBD	°C/W

STB7003

ELECTRICAL CHARACTERISTICS (V_{cc} = 2.8V, T_{amb} = 25 °C)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V _{cc}	Supply voltage		2.7		3.3	V
I _{PD}	Sleep supply current				5	uA

LNA1 @ 950MHz

I _{cc}	Supply current			4.5		mA
G	Power gain	G _{p1} ⁽¹⁾ G _{p2} ⁽¹⁾		-1 16		dB
NF	Noise figure	G _{p1} G _{p2}		5.5 1.5		dB
P1dB	Input 1 dB compr. power	G _{p1} G _{p2}		-19 -21		dBm
IIP3	Input third order intercept	G _{p1} ⁽²⁾ G _{p2} ⁽²⁾		-10.8 -12.6		dBm
VSWR _i	Input VSWR			2:1		
VSWR _o	Output VSWR			2:1		

LNA2 @ 1850MHz

I _{cc}	Supply current			7.3		mA
G	Power gain	G _{p1} ⁽¹⁾ G _{p2} ⁽¹⁾		-4 14.7		dB
NF	Noise figure	G _{p1} G _{p2}		9.6 1.9		dB
P1dB	Input 1 dB compr. power	G _{p1} G _{p2}		-11.5 -13.1		dBm
IIP3	Input third order intercept	G _{p1} ⁽³⁾ G _{p2} ⁽³⁾		-1.4 -3.5		dBm
VSWR _i	Input VSWR			2:1		
VSWR _o	Output VSWR			2:1		

LNA2 @ 1950MHz

I _{cc}	Supply current			7.3		mA
G	Power gain	G _{p1} ⁽¹⁾ G _{p2} ⁽¹⁾		-4.5 14.7		dB
NF	Noise figure	G _{p1} G _{p2}		9.8 2		dB
P1dB	Input 1 dB compr. power	G _{p1} G _{p2}		-10.8 -12.6		dBm
IIP3	Input third order intercept	G _{p1} ⁽⁴⁾ G _{p2} ⁽⁴⁾		-1.5 -3.7		dBm
VSWR _i	Input VSWR			2:1		
VSWR _o	Output VSWR			2:1		

Note(1) : G_{p1} min gain, G_{p2} max gain.

Note(2) : Measured data with two tones f_{IN1} = 945 MHz, f_{IN2} = 945.8 MHz, P_{IN} = - 33 dBm for each tone

Note(3) : Measured data with two tones f_{IN1} = 1850 MHz, f_{IN2} = 1850.8 MHz, P_{IN} = - 33 dBm for each tone

Note(4) : Measured data with two tones f_{IN1} = 1960 MHz, f_{IN2} = 1960.8 MHz, P_{IN} = - 33 dBm for each tone

GAIN SELECTION

BSW	GC	GSM LNA1	DCS/PCS LNA2
0	0	High gain	Off
0	1	Low gain	Off
1	0	Off	High gain
1	1	Off	Low gain

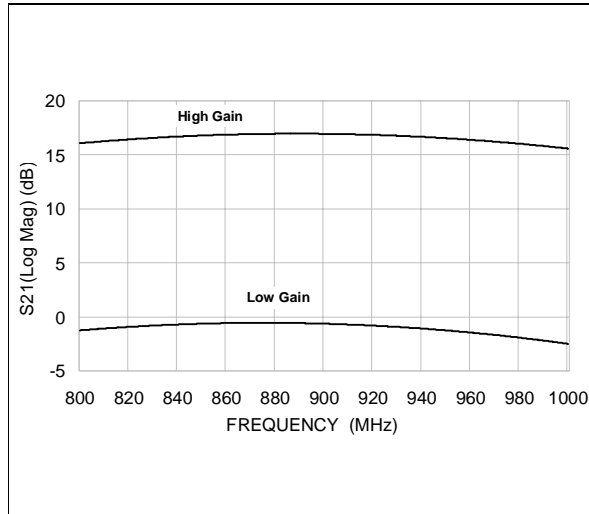
PINOUT

Pin Number	Symbol	Description
1	PD	Power down
2	AI1	GSM LNA1 input
3	GND	Ground
4	AI2	DCS/PCS LNA2 input
5	BSW	Band switch between GSM and DCS/PCS RF output
6	V _{CCDCS}	DCS Supply voltage
7	AO2	DCS/PCS LNA2 output
8	V _{CCGSM}	GSM/BIAS Supply voltage
9	AO1	GSM LNA1 output
10	GC	LNA1/2 gain control

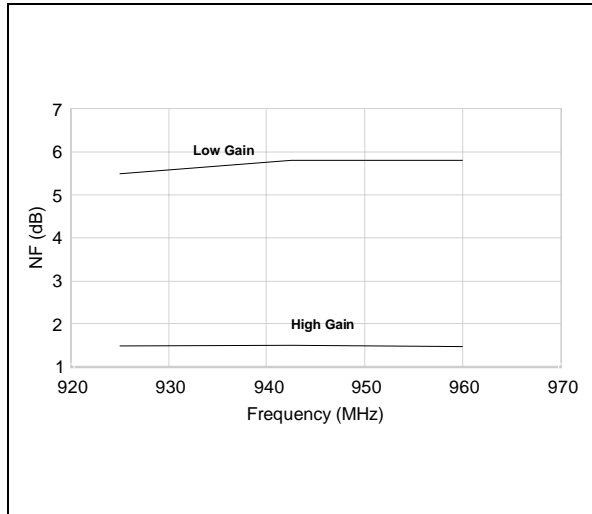
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TYPICAL PERFORMANCE (GSM BAND)

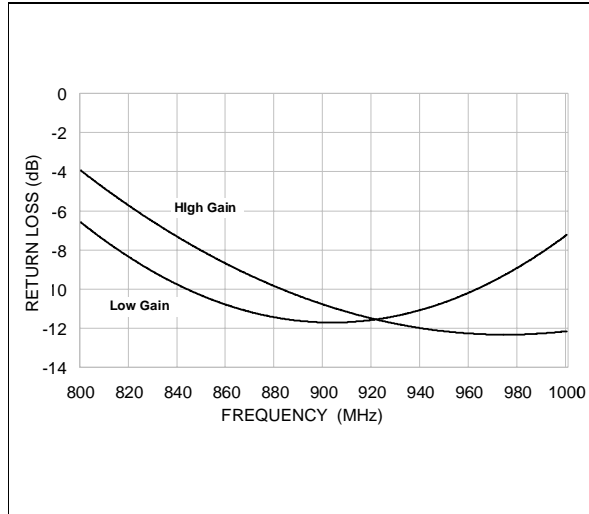
Power Gain vs. Frequency



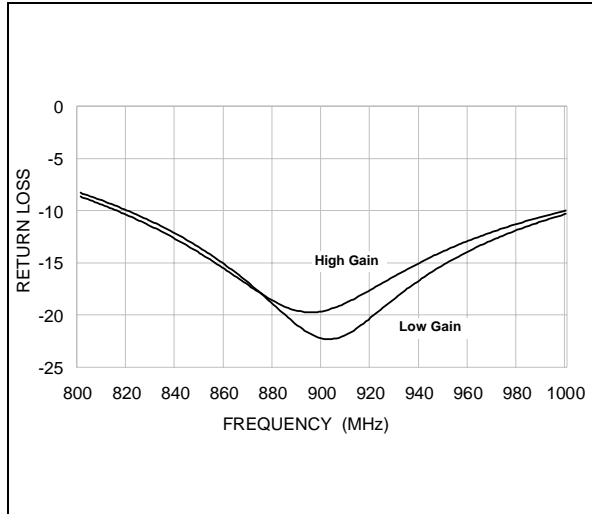
Noise Figure vs. Frequency



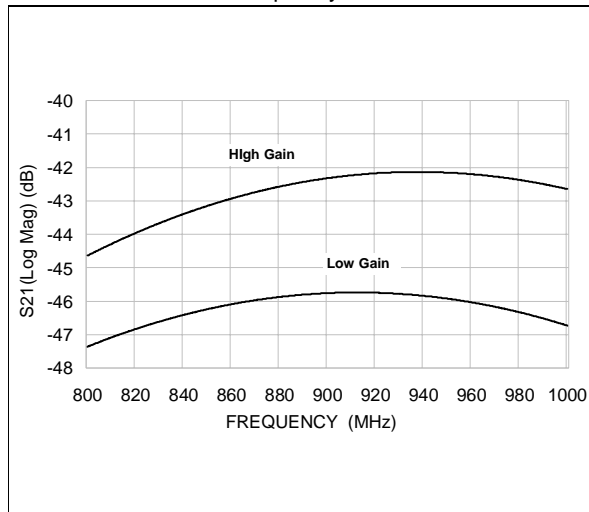
Input Return Loss vs. Frequency



Output Return Loss vs. Frequency

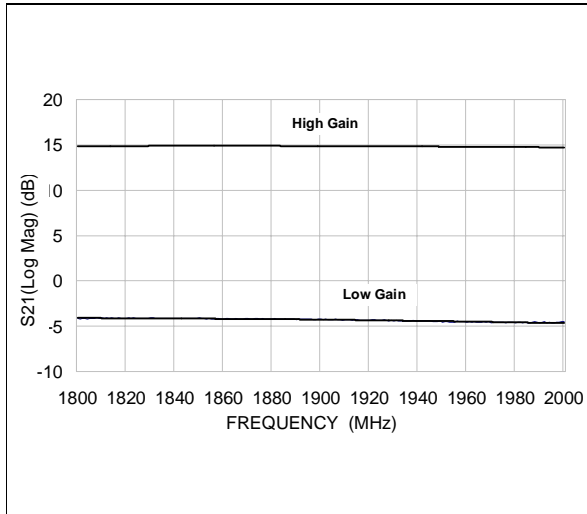


Reverse Isolation vs. Frequency

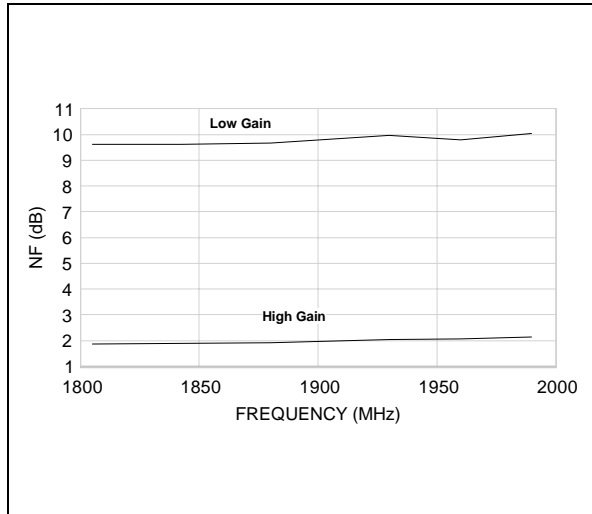


TYPICAL PERFORMANCE (DCS / PCS BAND)

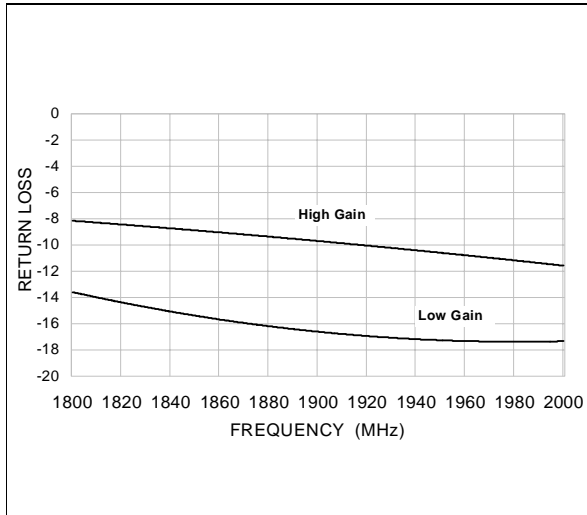
Power Gain vs. Frequency



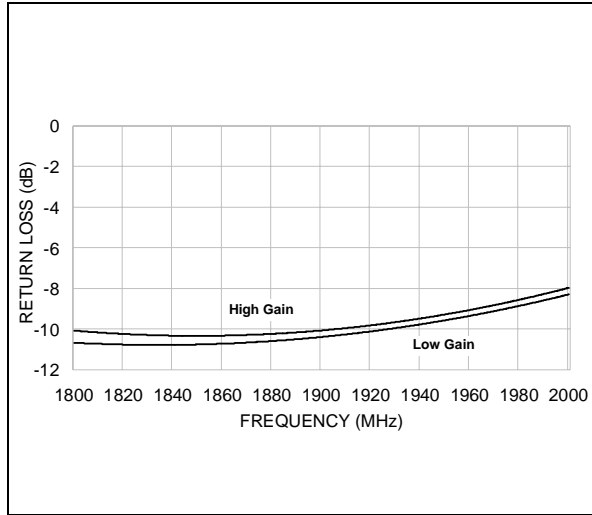
Noise Figure vs. Frequency



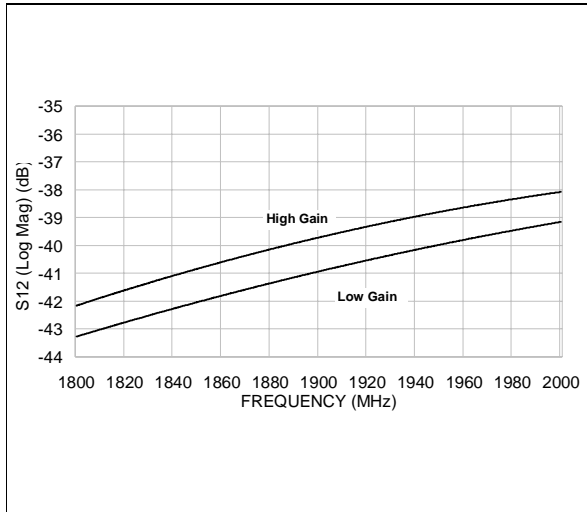
Input Return Loss vs. Frequency



Output Return Loss vs. Frequency

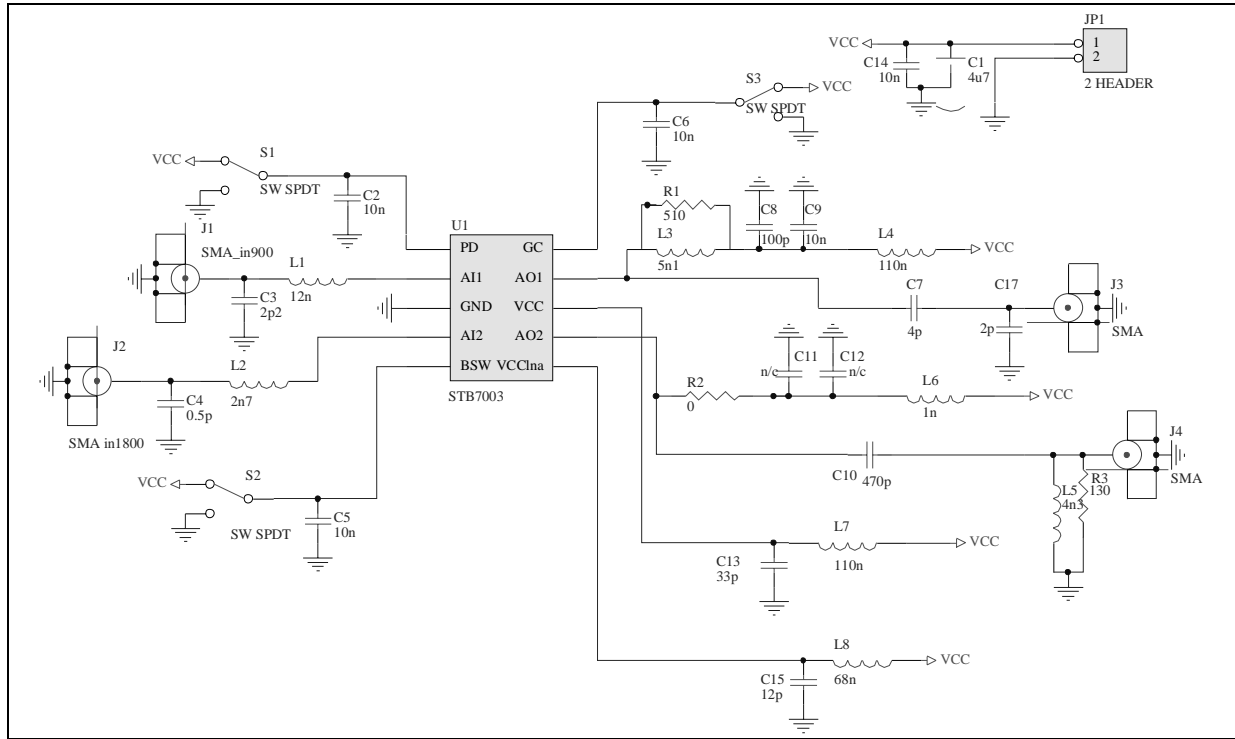


Reverse Isolation vs. Frequency



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TEST CIRCUIT SCHEMATIC

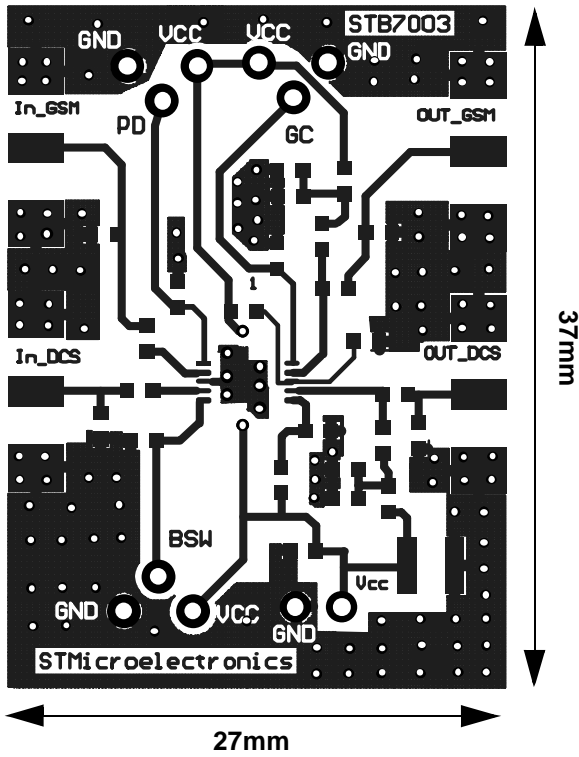


BILL OF MATERIAL

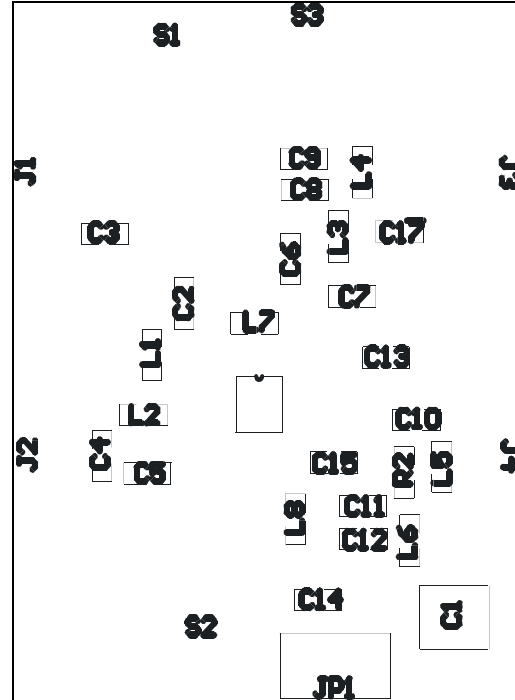
Used	Part Type	Designator	Footprint	Description
1	12n	L1	0603	COILCRAFT KIT C124-2
1	2n7	L2	0603	COILCRAFT KIT C124-2
1	5n1	L3	0603	COILCRAFT KIT C124-2
2	110n	L4, L7	0603	COILCRAFT KIT C124-2
1	4n3	L5	0603	COILCRAFT KIT C124-2
1	1n	L6	0402	COILCRAFT KIT C128
1	68n	L8	0603	COILCRAFT KIT C124-2
1	1u	C1	TAG A	
6	10n	C2, C5, C6	0603	MURATA 0603 KIT
		C9, C14		
1	2p2	C3	0603	MURATA 0603 KIT
1	0.5p	C4	0603	MURATA 0603 KIT
1	4p	C7	0603	MURATA 0603 KIT
1	100p	C8	0603	MURATA 0603 KIT
1	470p	C10	0603	MURATA 0603 KIT
2	n/c	C11, C12	0603	
1	33p	C13	0603	MURATA 0603 KIT
1	12p	C15	0603	MURATA 0603 KIT
1	2p	C17	0603	MURATA 0603 KIT
1	510	R1	0603	
1	0	R2	0603	
1	130	R3	0603	

EVALUATION BOARD

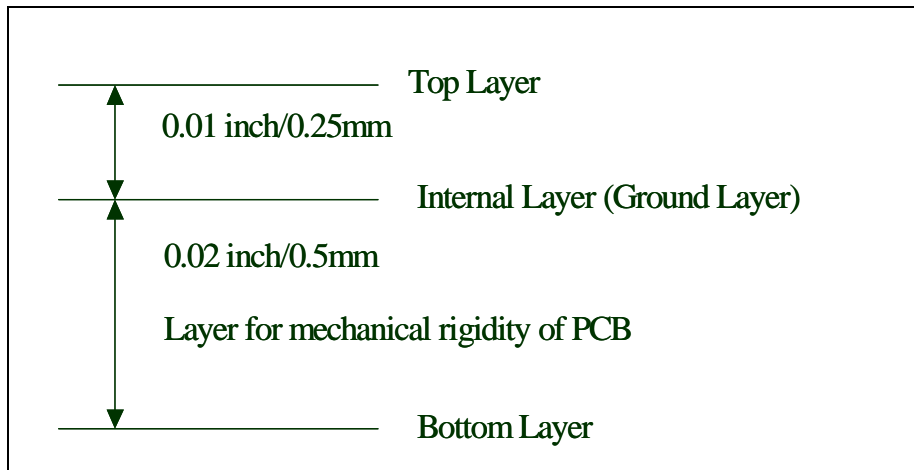
TOP LAYER



COMPONENTS PLACEMENT

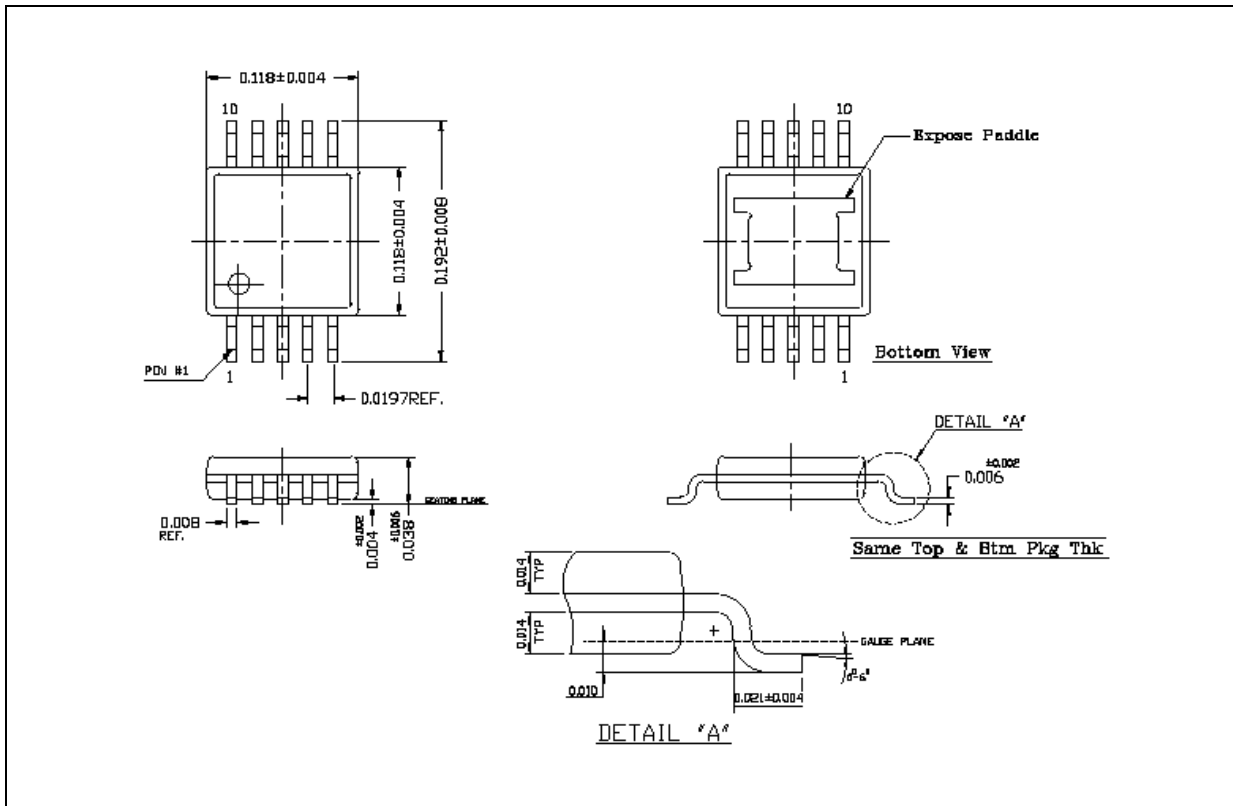


PCB CROSS SECTION



STB7003

MECHANICAL DATA



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