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Application Note

**AM Radio Amplifier Module with Filter
Using the 2SK3557**

January 2014

Feature of AM-band Amplifier Module

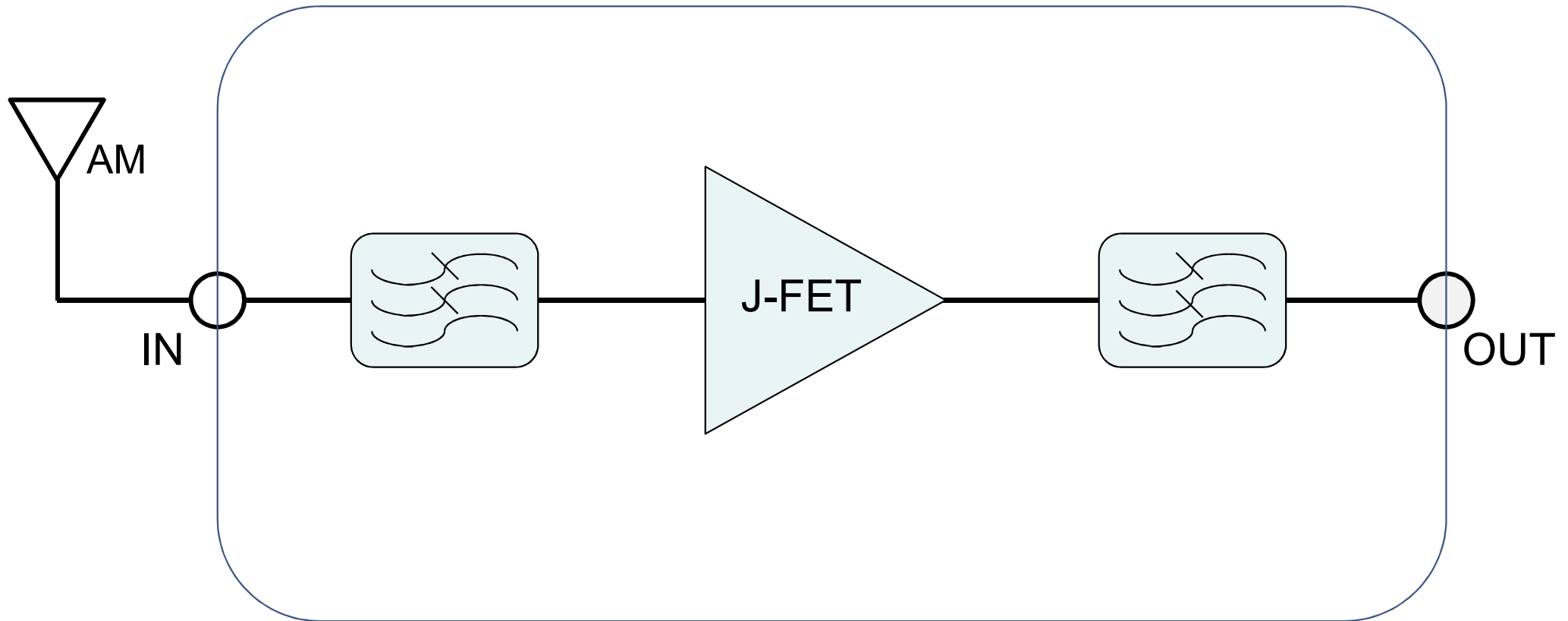
- J-FET : 2SK3557
- High Gain : $G_a=9.6\text{dB}$ @1MHz ($Z_o=50\Omega$)
- Excellent Gain Flatness : $\Delta G_a1 < 0.3\text{dB}$
- Low Gain Variation : $\Delta G_a2 < 1.1\text{dB}$ for $V_{DD}=3\sim 8\text{V}$
- High FM Suppression : $< -80\text{dB}$
- High Impedance at INPUT/OUTPUT Port

AM-band Amplifier Module ($Z_o=50\Omega$)			
Parameter	Unit	AM-band	FM-band
Frequency	[MHz]	0.52~1.71	76~108
VDD	[V]	5	
IDD	[mA]	16.8	
G_a	[dB]	9.6	< -80
ΔG_a1 *1	[dB]	0.28	-
ΔG_a2 *2	[dB]	1.05	-
Input Impedance	[Ω]	High	-
Output Impedance	[Ω]	High	-

*1 : G_a Variation within AM-band

*2 : G_a Variation for $V_{DD}=3\sim 8\text{V}$

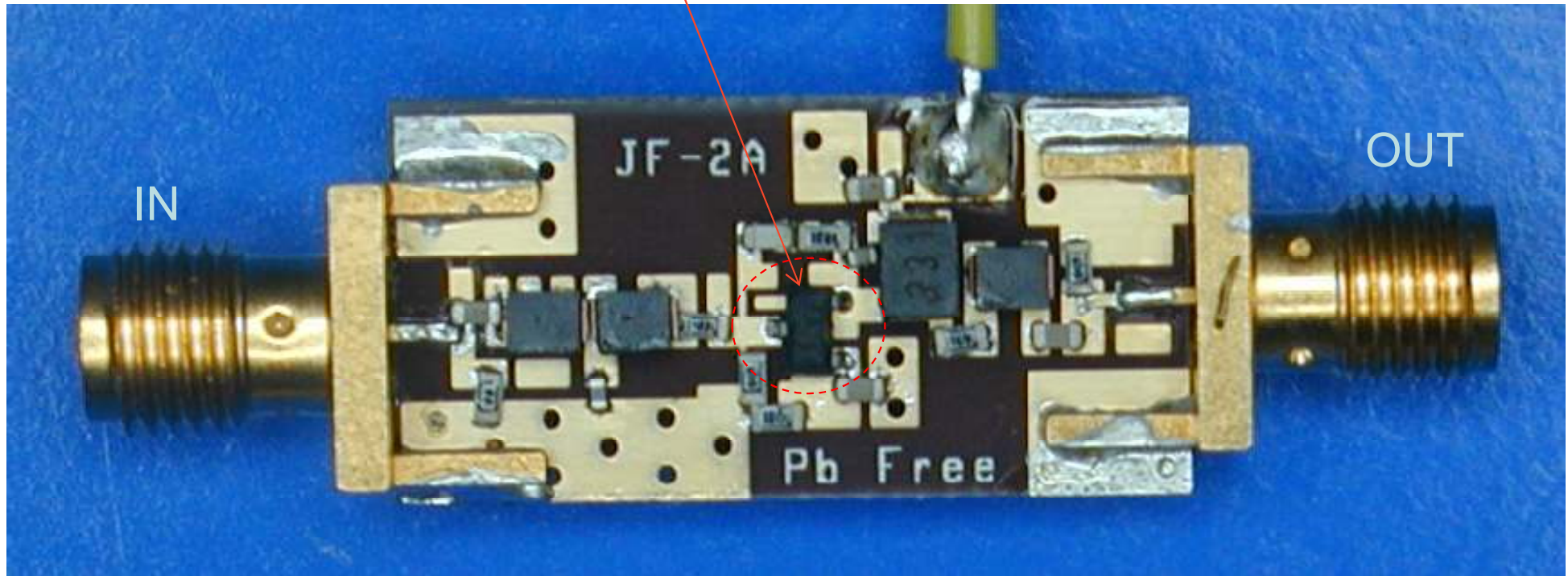
Block Diagram of AM-band Amplifier



Board of AM-band Amplifier Module

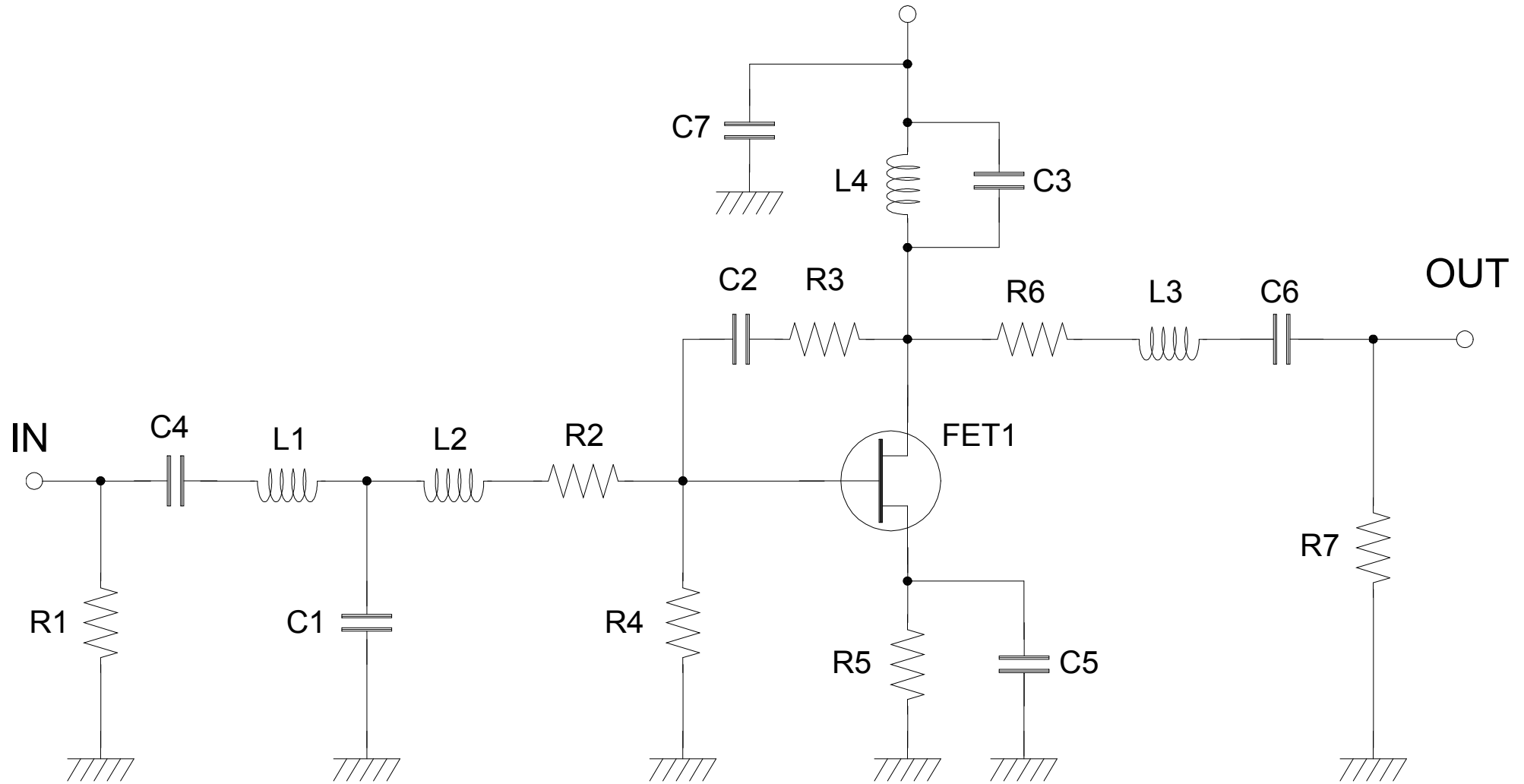
2SK3557
(J-FET)

VDD=5V



Circuits of AM-band Amplifier Module

VDD=5V-16.8mA

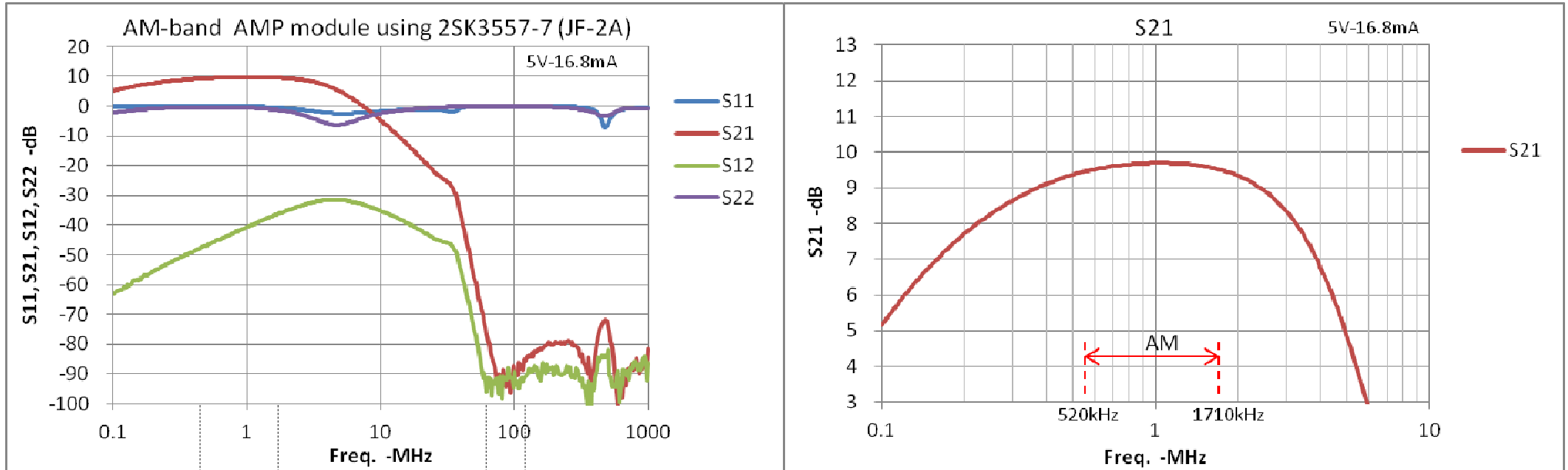


Bill of Materials

Item	Symbol	Value	Manufacturer	Size
JFET	FET1	2SK3557	ON Semiconductor	SC59
Capacitor	C1	10 pF	TAIYOYUDEN	1005
	C2	12 pF	Murata GQM1882C1H120	1608
	C3	120 pF	TAIYOYUDEN	1005
	C4,C5,C6,C7	0.1 uF	ROHM MCH182CN104KK	1608
Resistor	R1	22 k Ω	Various	1608
	R2	270 Ω	Various	1608
	R3	120 Ω	Various	1608
	R4	100 k Ω	Various	1608
	R5	10 Ω	Various	1608
	R6	150 Ω	Various	1608
	R7	100 k Ω	Various	1608
Inductor	L1,L2,L3	3.3 uH	TDK NLV25T-3R3J-PF	2520
	L4	330 uH	TDK NLCV32T-331K-PF	3225
Material	-	FR4	JF-2A	25.4 X 12.7 mm

Characteristics of Gain

Zo=50Ω



AM

FM

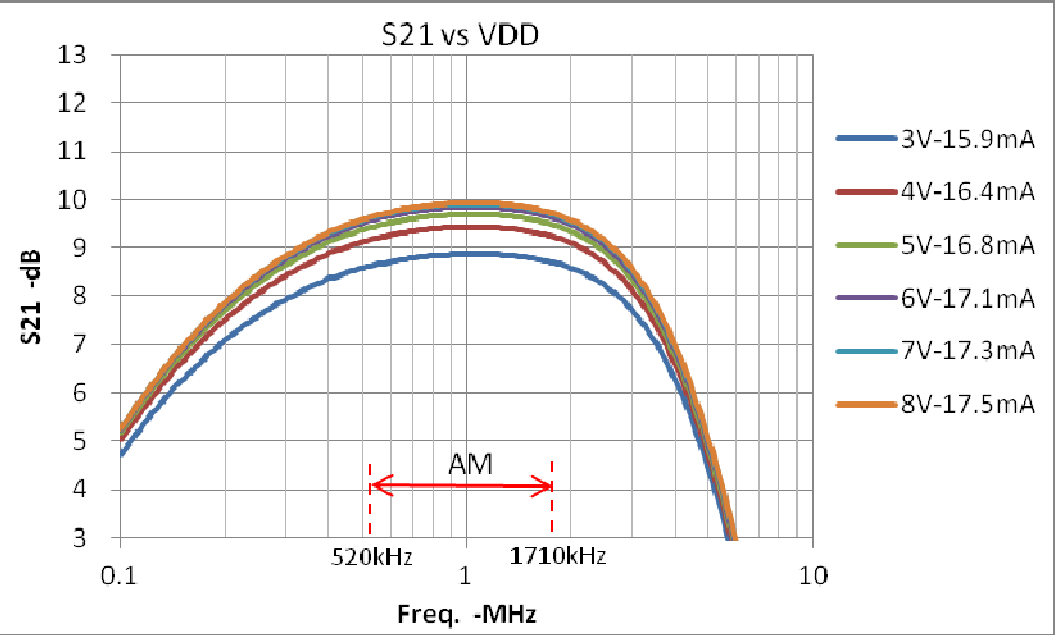
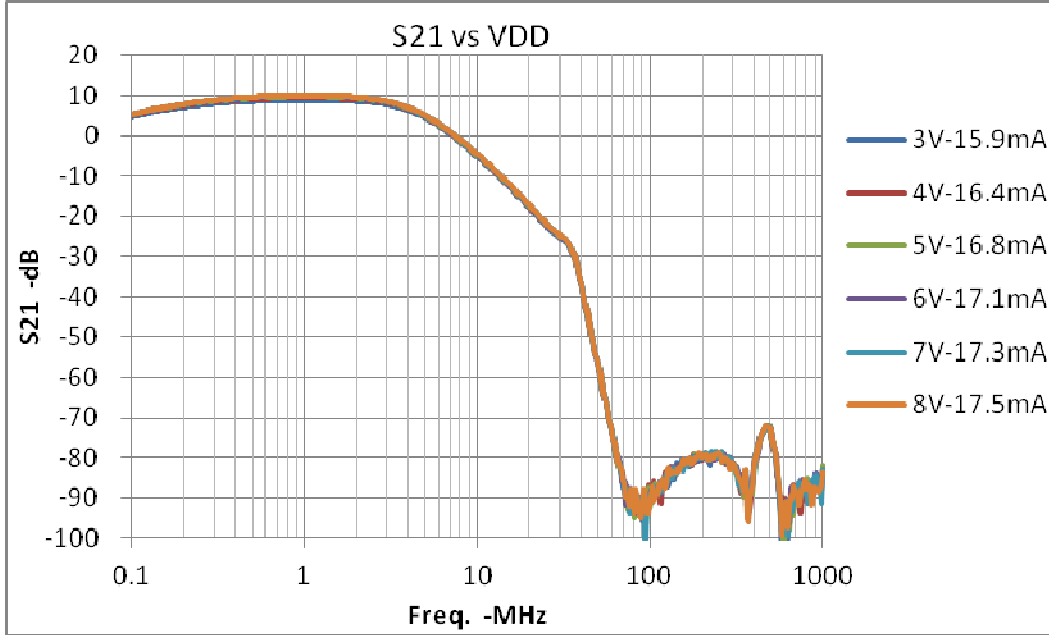
Ga = 9.6dB in AM-band (0.52~1.71MHz)
Ga < -80dB in FM-band (76~108MHz)

Ga=9.41dB @0.52MHz
 Ga=9.69dB @1.00MHz
 Ga=9.51dB @1.71MHz

ΔGa1=0.28dB within AM-band

Gain vs VDD

Zo=50Ω



$\Delta G_{a2} = 1.05\text{dB}$ for $VDD=3 \sim 8\text{V}$



Characteristics of Impedance

