

3.6 V, 450 mW DECT RF Power Amplifier IC

V 1.0

MA02203AD

Features

- Ideal for DECT Applications
- +26.5 dBm Output Power
- 24.5 dB Power Gain
- Single Positive Supply
- Class A Bias
- No External RF Matching Required

Description

The MA02203AD is a two stage power amplifier designed for DECT applications to have an output power of +26.5 dBm with an input power of 2 dBm. This power amplifier operates at +3.6 volts with 35% typical power added efficiency. The MA02203AD is mounted in a narrow body 16-pin SOIC plastic package.

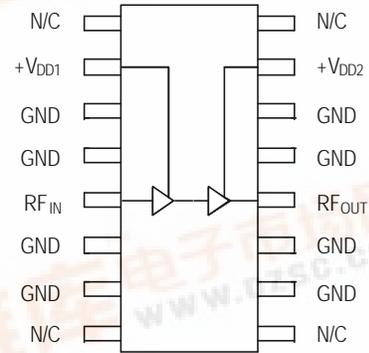
The MA02203AD is fabricated using M/A-COM's self-aligned MSAG[®]-Lite MESFET process for a low single supply voltage, high power efficiency, and excellent reliability.

This part is **not** recommended for new designs. M/A-COM's MA02206GJ has superior RF performance with less DC power consumption in a smaller package. Pricing on the MA02206GJ is also less than the MA02203AD.

Ordering Information

Part Number	Description
MA02203AD-R7	7 inch, 1000 piece reel
MA02203AD-R13	13 inch, 3000 piece reel

Functional Schematic



16 pin narrow body SOIC

Pin Configuration

Pin	Function	Description
1	N/C	Not Connected
2	V _{DD1}	First Stage Supply Voltage
3	GND	Ground
4	GND	Ground
5	RF _{IN}	RF Input
6	GND	Ground
7	GND	Ground
8	N/C	Not Connected
9	N/C	Not Connected
10	GND	Ground
11	GND	Ground
12	RF _{OUT}	RF Output
13	GND	Ground
14	GND	Ground
15	V _{DD2}	Second Stage Supply Voltage
16	N/C	Not Connected

Specifications subject to change without notice.

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Electrical Specifications: $T_S = 40\text{ }^\circ\text{C}^1$, $Z_0 = 50\text{ }\Omega^{2,3}$

Parameter	Test Conditions	Units	Min	Typ	Max
Frequency		MHz	1880		1900
Output Power		dBm	25.5	26.5	27.5
Pout Frequency Dependency		dB		0.2	0.5
Power Gain		dB		24.5	
Current Consumption		mA		350	420
Input VSWR, PA On		-		1.6:1	2.0:1
Input VSWR, PA Off	$V_{DD1}, V_{DD2} = 0\text{ V}$	-		1.4:1	2.0:1
Isolation, PA Off	$V_{DD1}, V_{DD2} = 0\text{ V}$	dB	40		
2 nd Harmonics		dBc		31	
3 rd Harmonics		dBc		55	
Thermal Resistance	Junction of 2nd stage FET to pin 11, Duty Cycle=50%	$^\circ\text{C/W}$			63
Load Mismatch	$V_{DD} = 4.6\text{ V}$, VSWR = 10:1, $P_{IN} = 7\text{ dBm}$	-	No degradation		
Stability	$P_{IN} = -3\text{ to }+7\text{ dBm}$, $V_{DD} = 0 - 4.6\text{ V}$, $0\text{ mW} < P_{OUT} < 450\text{ mW}$, $T_S = -40\text{ to }+75\text{ }^\circ\text{C}$, Load VSWR = 10:1	-	All spurs < -60 dBc		

1. T_S is the temperature measured at the soldering point of pin 11.

2. Unless otherwise specified, input power is +2 dBm, V_{DD} is +3.6 V, and test frequency is 1890 MHz.

Absolute Maximum Ratings¹

Parameter	Absolute Maximum
Max Input Power	+6 dBm
Operating Voltages	+5.5 volts
Operating Temperature, T_S	-40 $^\circ\text{C}$ to +75 $^\circ\text{C}$
Channel Temperature	+150 $^\circ\text{C}$
Storage Temperature	-40 $^\circ\text{C}$ to +150 $^\circ\text{C}$

1. Exceeding any one or combination of these limits may cause permanent damage.

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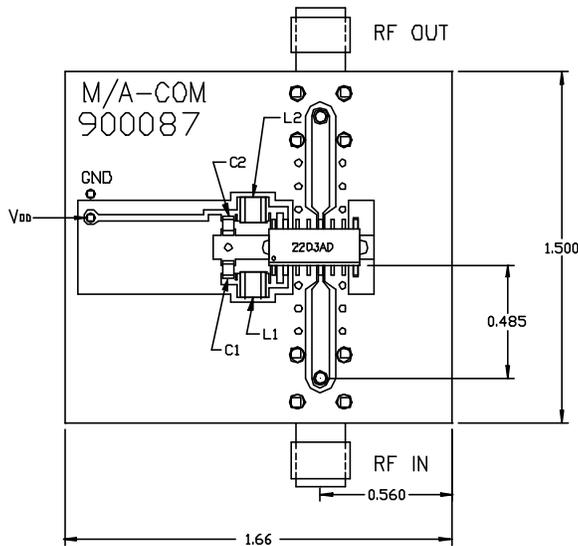
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Application Information

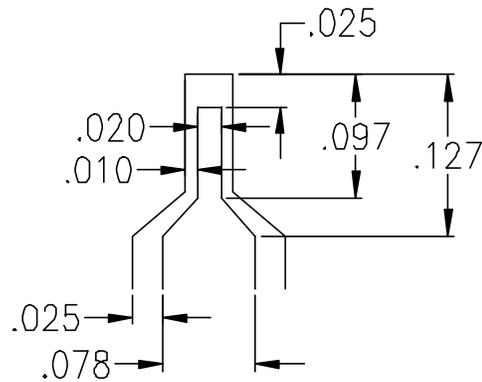
Static Sensitivity

Gallium arsenide integrated circuits are ESD sensitive and can be damaged by static electricity. Use proper ESD precautions when handling these devices.

Board Layout



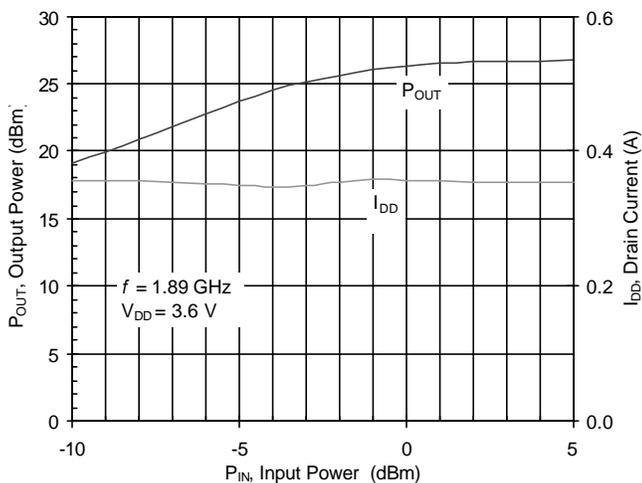
Sample Test Board



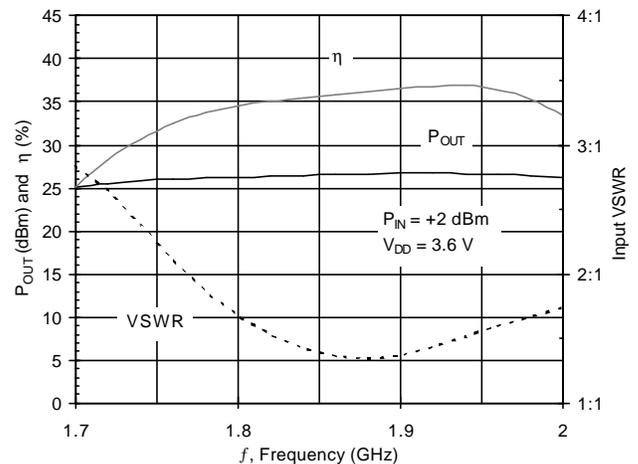
50 Ohm Lead Transition

Typical Performance Curves

Output Power and Current vs. Input Power



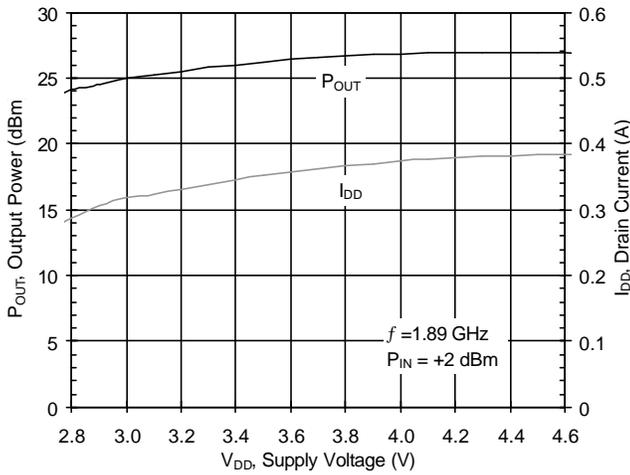
Output Power, PAE, and VSWR vs. Frequency



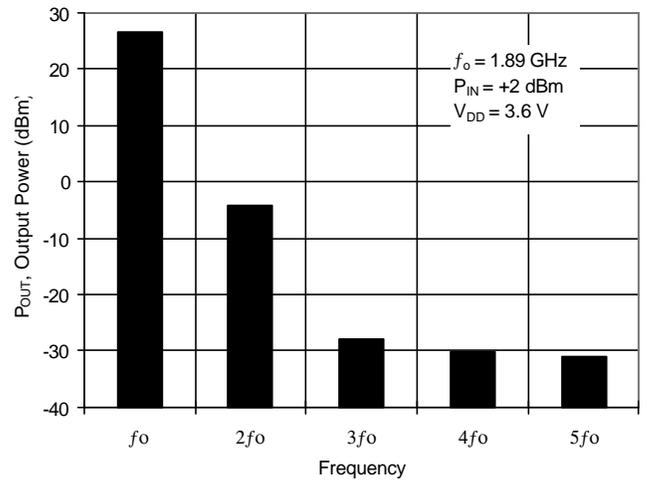
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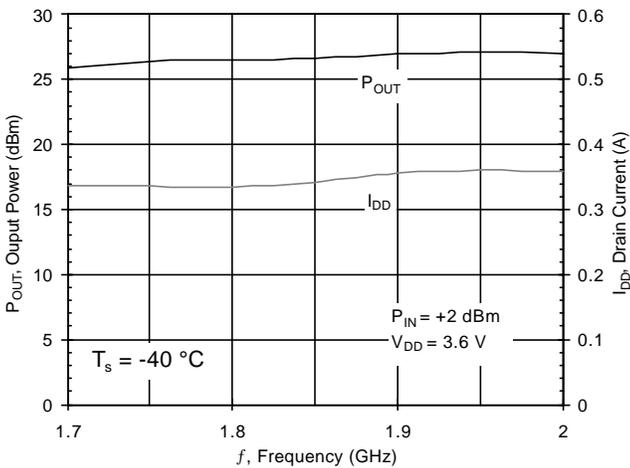
Output Power and Current vs. Supply Voltage



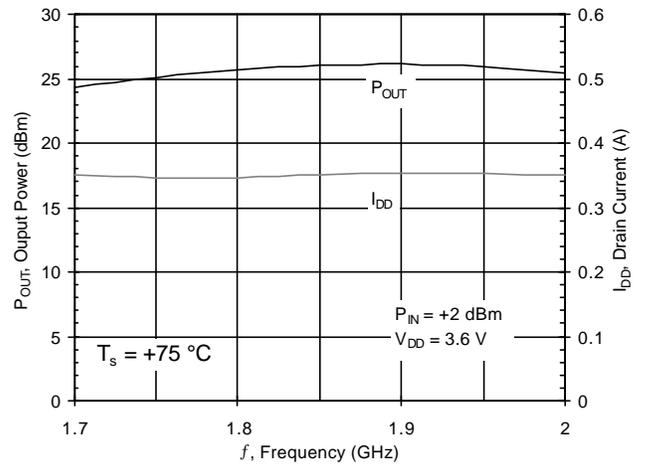
Harmonics



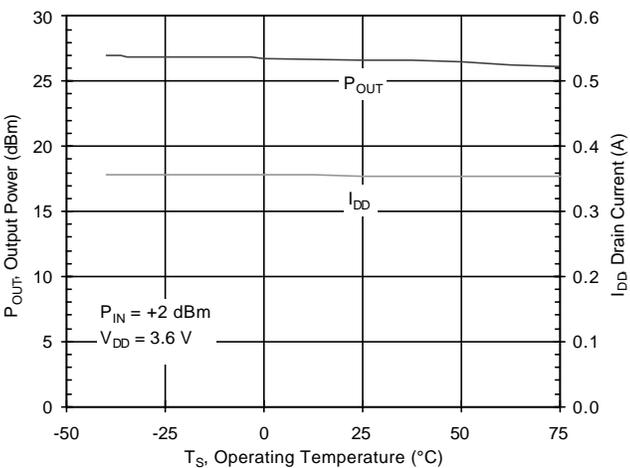
Output Power and Current vs. Frequency, T_s = -40°C



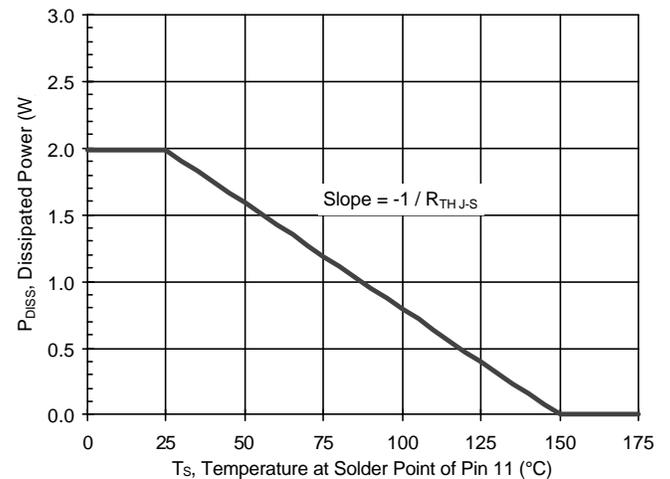
Output Power and Current vs. Frequency, T_s = +75°C



Output Power and Current vs. Temperature



Power Dissipation vs. Temperature

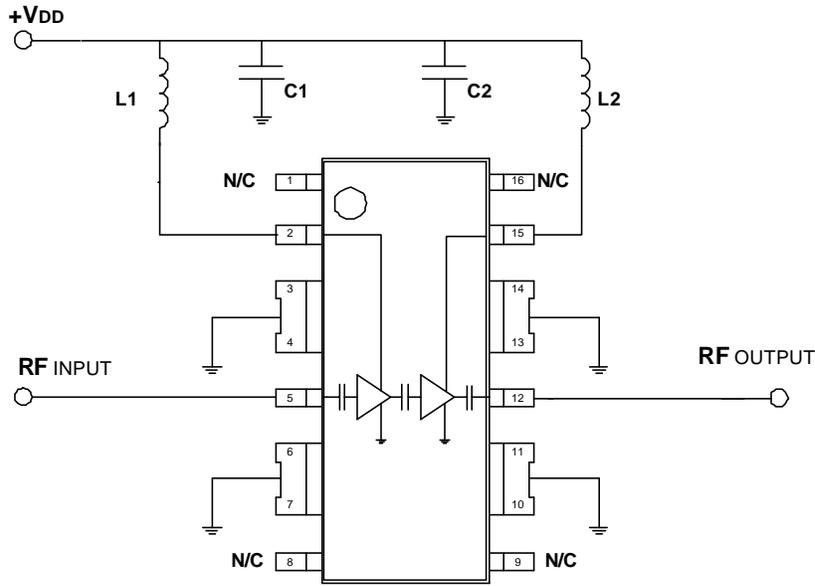


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Application Schematic



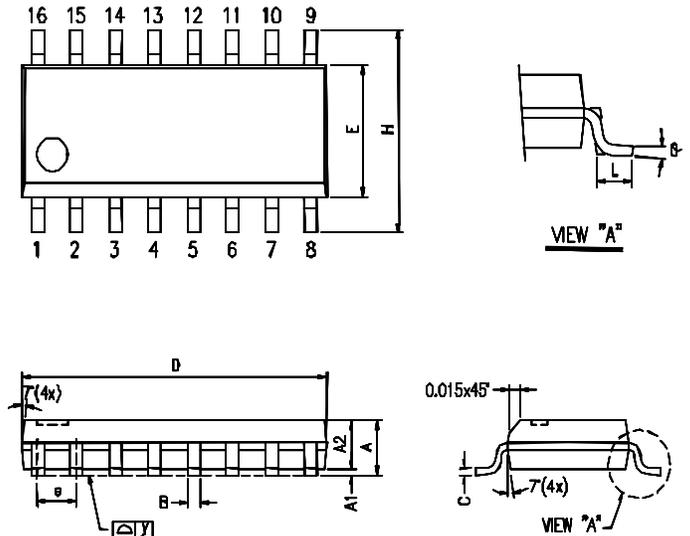
60mil GETEK Board

List of components:

- C1 = C2 = 100 pF DLI multilayer ceramic chip capacitor (C11AH101K5TXL)
- L1 = 8.2 nH Coilcraft chip inductor (1008CT.080XKBB)
- L2 = 27 nH Coilcraft chip inductor (1008CS.270XKBB)

SOIC-16 Narrow Body Package

Symbol	Dimensions in millimeters			Dimensions in inches		
	Min	Nom	Max	Min	Nom	Max
A	1.35	1.60	1.75	0.053	0.063	0.068
A1	0.10		0.25	0.004		0.010
A2		1.45			0.057	
B	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	9.80	9.91	10.01	0.386	0.390	0.394
E	3.80	3.91	4.00	0.150	0.154	0.157
e		1.27			0.050	
H	5.79	5.99	6.20	0.228	0.236	0.244
L	0.38	0.71	1.27	0.015	0.028	0.050
y			0.10			0.004
θ	0°		8°	0°		8°



NOTES:

1. Controlling dimension: inch
2. Lead frame material: copper alloy C151
3. Lead thickness after solder plating will be 0.013" maximum
4. Dimension "D" does not include mold flash, protrusions or gate burrs
5. Dimension "E" does not include interlead flash or protrusions
6. Tolerance: ±0.010" unless otherwise specified

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