

**Transmit Module for RFID  
850-960 MHz**

**MAIA-007851-000100  
V1 P**

**Features**

- Fully Integrated Buffer Amplifiers, Mixer, Power Amplifier
- 0 to +7 dBm LO Drive
- +3.6V Nominal Supply Voltage
- +32.5 dBm Typical Output Power
- PA Matching Included in Device
- Lead-Free PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- 260°C Reflow Compatible

**Description**

M/A-COM's MAIA-007851 is a 850-960 MHz, high efficiency, low cost transmit module designed for RFID applications. This module includes buffer amplifiers, a passive mixer, and a high efficiency power amplifier, encapsulated in a low cost, miniature surface mount PQFN 6 mm square, 28 lead plastic package. The dies utilize M/A-COM's unique HMIC silicon/glass and GaAs processes. The product performance maximizes the advantages provided by these processes with the realization of low loss passive elements and efficient diode technology which in turn provides excellent harmonic suppression and output noise performance. In addition, this module includes matching networks to achieve 50 ohm input and output impedances, therefore no external RF matching is required.

**Applications**

This transmit module is well suited for applications where small size and high performance is required. This transmit module is specifically targeted for the RFID market in the United States, European, and Japanese bands. This transmit module can also be used for other applications in the 850 - 960 MHz frequency range.

**Ordering Information**

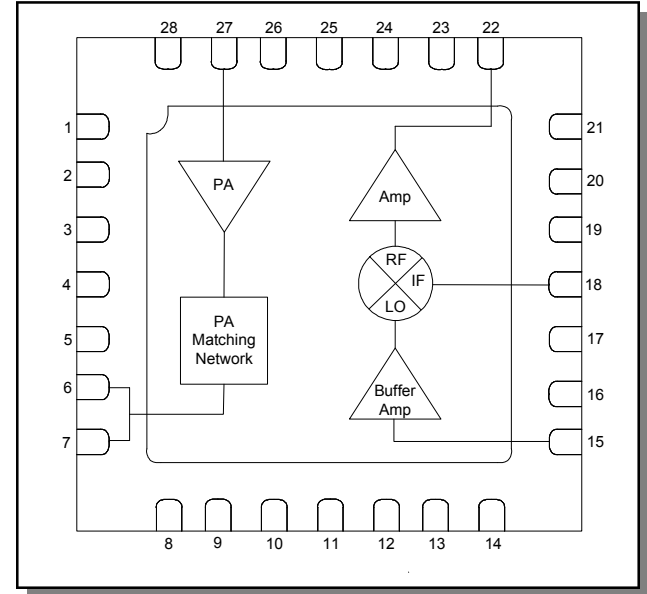
Part Number	Package
MAIA-007851-000100	Bulk Packaging
MAIA-007851-0001TR	1000 piece reel
MAIA-007851-0001TB	Sample Test Board

Note: Reference Application Note M513 for reel size information.

Note: Die quantity varies.

***This PRELIMINARY Data Sheet contains information regarding a product M/A-COM has under development. Performance is based on measured results and target specifications. Commitment to produce in volume is not guaranteed.***

**Functional Block Diagram**



**Pin Configuration**

in No.	Function	Pin No.	Function
1	VDD3 (VCC1)	15	LO_IN
2	VDD3 (VCS)	16	GND
3	GND	17	GND
4	GND	18	IF_IN
5	VDD3 (VCC2)	19	GND
6	PA OUT	20	VDD2
7	PA OUT	21	GND
8	GND	22	RFOUT
9	GND	23	VDD2
10	VDD3 (VCC3)	24	GND
11	VDD3 (VCC3)	25	RFOUT
12	GND	26	VCTRL
13	VDD1	27	RF_IN
14	GND	28	GND

The exposed pad centered on the package bottom must be connected to RF and DC ground. (For PQFN Packages)

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

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• **North America** Tel: 800.366.2266 / Fax: 978.366.2266  
 • **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300  
 • **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298

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**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 50 \Omega$**

Unless otherwise noted: LO\_IN= +5 dBm, IF\_IN= 0 dBm @ 1 MHz, VDD1=VDD2=VDD3= +3.6V, VCTRL=2.6 V

Parameter	Test Conditions	Units	Min	Typ	Max
Frequency	-	MHz	850	-	960
PA Output Power (Saturated)	-	dBm	-	32.5	-
Power Added Efficiency	PA only	%	-	40	-
Harmonics (PA Output)	-	dBc	-	-36	-
VCTRL	-	V	0.0	-	3.5
ICTRL	-	mA	-	4.0	-
PA Control Voltage Slope	$0 \leq P_{out} \leq 32\text{dBm}$	dB/V	-	45	-
Small Signal Gain (IF_IN to PA Out)	-	dB	-	42	-
PA Output VSWR	-	Ratio	-	1.9:1	-
PA Input VSWR	-	Ratio	-	2.6:1	-
LO Port VSWR	-	Ratio	-	2.0:1	-
IF Port VSWR	-	Ratio	-	1.7:1	-
LO_IN Power	-	dBm	0	-	7
IF 1 dB Bandwidth	IF Port is DC coupled	MHz	25	-	-
VDD1	-	Volts	3.3	3.6	3.9
VDD2	-	Volts	3.3	3.6	3.9
VDD3	-	Volts	3.3	3.6	3.9
IDD1	VDD1 = +3.3V (Min), +3.6V (Typ), +3.9V (Max)	mA	-	60	-
IDD2	VDD2 = +3.3V (Min), +3.6V (Typ), +3.9V (Max)	mA	-	30	-
IDD3	VDD3 = +3.3V (Min), +3.6V (Typ), +3.9V (Max)	mA	-	1100	-

**Absolute Maximum Ratings <sup>1,2</sup>**

Parameter	Absolute Maximum
VDD1, VDD2, VDD3	-0.5V to +5.0V
VCTRL <sup>3</sup>	-0.5V to +3.8V
Incident Power – IF IN	+20 dBm
Incident Power – LO IN	+15 dBm
Operating Temperature	-30°C to +70°C
Storage Temperature	-40°C to +125°C

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.
- Additionally, VCTRL cannot exceed VDD3 + 0.5V

**Handling Procedures**

Please observe the following precautions to avoid damage:

**Static Sensitivity**

Gallium Arsenide and Silicon Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

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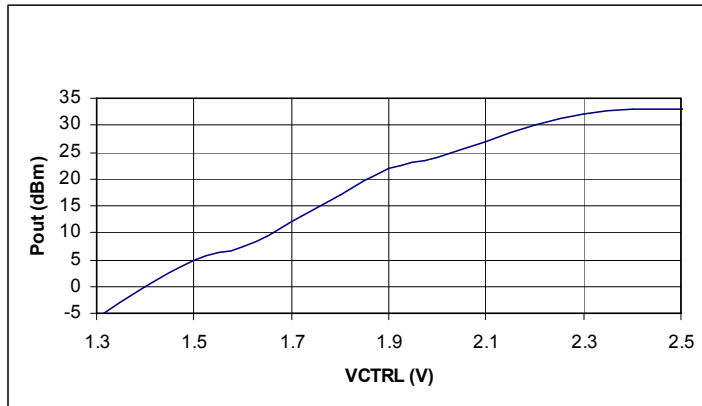
Visit [www.macom.com](http://www.macom.com) for additional data sheets and product information.

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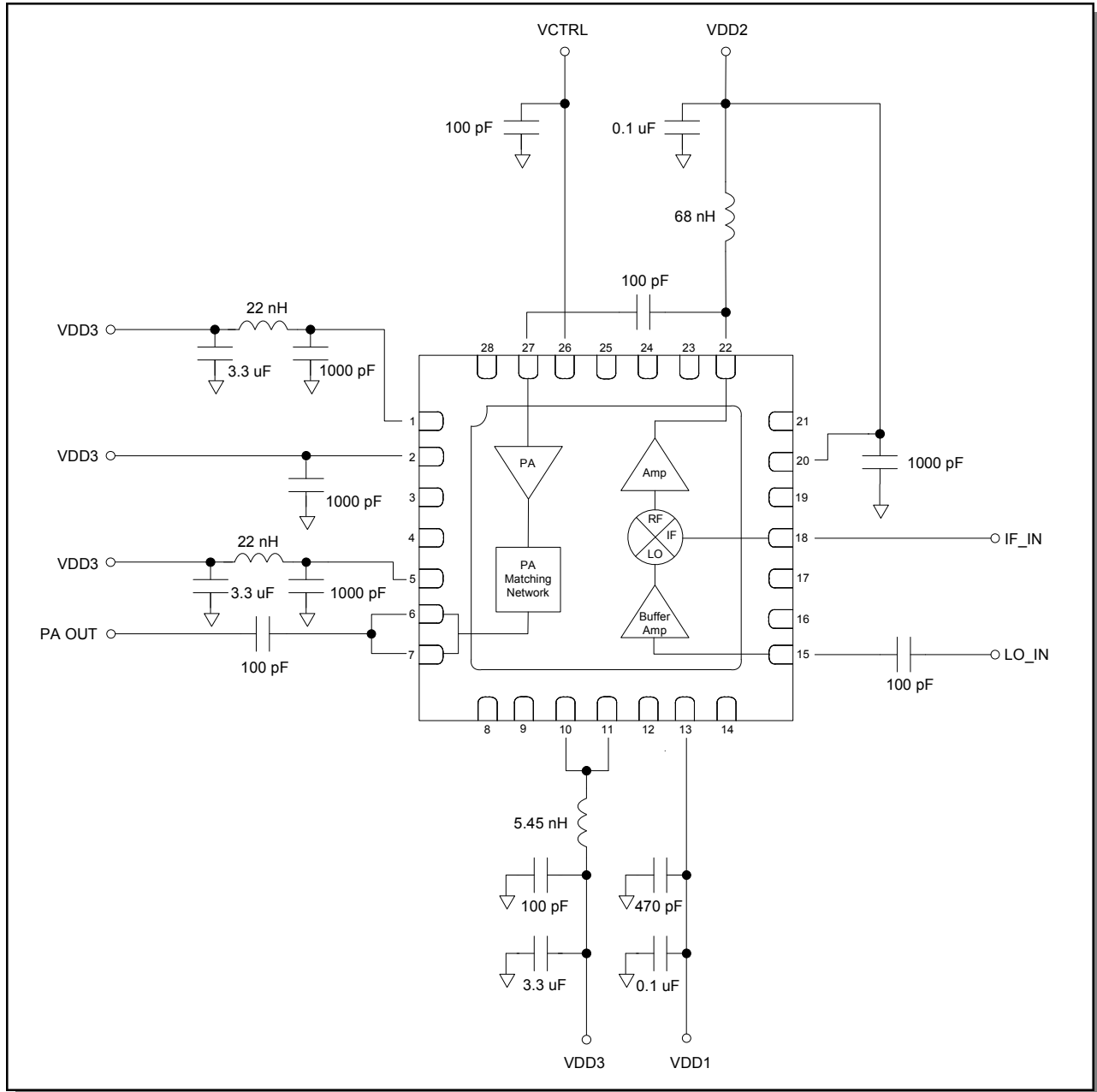
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### Typical Performance Curves

*P<sub>out</sub> vs. V<sub>ctrl</sub> F=900MHz, T=25°C*



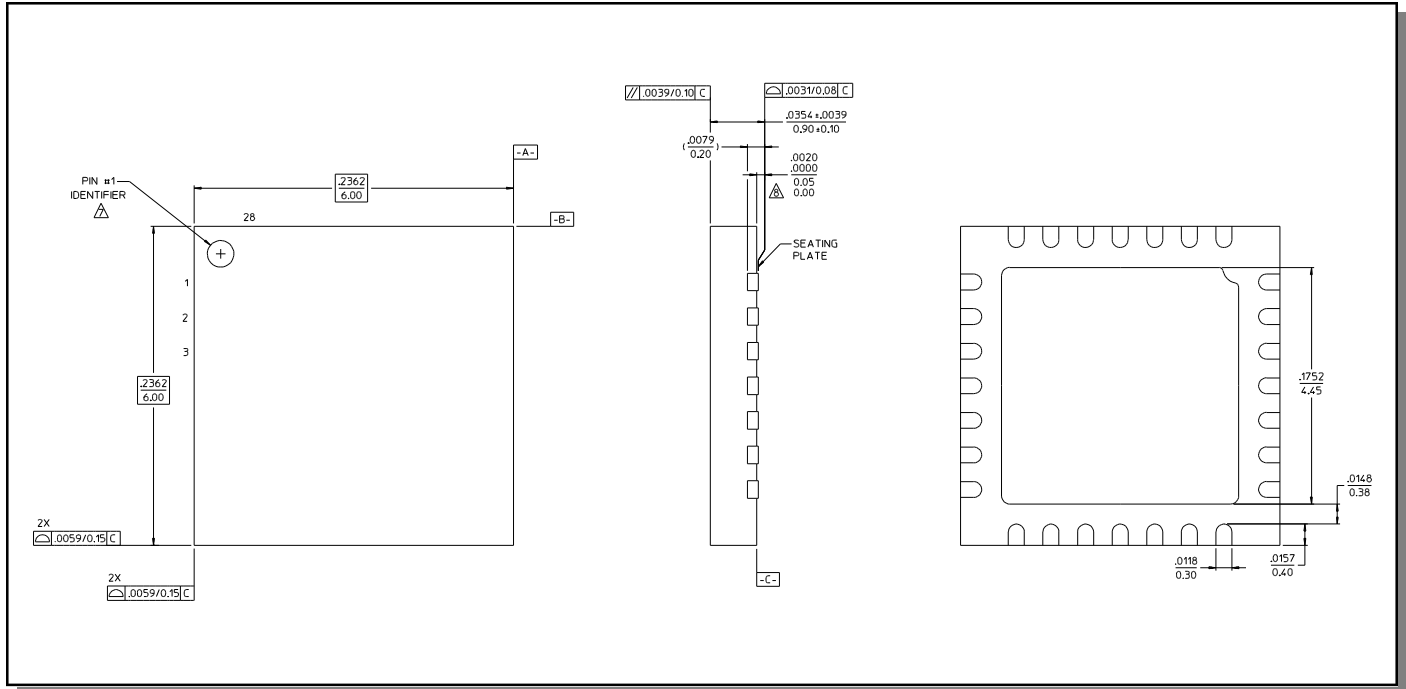
**Schematic with Off-Chip Components**



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**Lead free, 6 mm, 28-Lead PQFN†**



† Reference Application Note M538 for lead-free solder reflow recommendations.