Announcing High Performance Rugged Plastic for Mobile Radio

AFIC901N and AFT05MS003N

JULY, 15 | 2015

freescale™
Airfast RF

External Use

Mobile Radio Applications

Public Safety: P25, TETRA

Transportation

Construction

Marine

Dispatch

M2M Metering

RF Mobile Radio Challenges

- Reliability, ruggedness, stability
  - Mission critical applications
  - Harsh, uncontrolled environment
- Reduce equipment size
  - Lighter handheld radio
- Faster time to market
  - Broadband capability to support multi-band/multi-mode radios
- Linearity
  - Move to digital radios

freescale Airfast RF

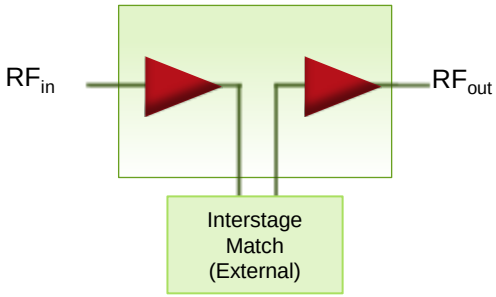
AFIC901N: 1 W Frequency-configurable LDMOS RFIC

136–941 MHz

1 W CW @ 7.5 V

Two-stage LDMOS Driver

- External matching for interstage allows optimization for a range of voltages and frequencies
- 1 W output power
- Housed in a QFN 24-lead 4 x 4 package
- Product Longevity program: warranted availability until 2030



Available Reference Circuits

Board Frequency (MHz)	Power (W P1dB)	Gain (dB)	Drain Eff. (%)	PCB Size
136-174	1 CW	30	63.2	0.83” x 1.88”
350-520	1 CW	26	66.8	0.83” x 1.88”

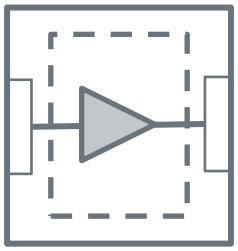
freescale Airfast RF

AFT05MS003N

136–941 MHz

> 3 W (P1dB CW @ 7.5 V)

- Unmatched input and output LDMOS transistor
- Housed in a SOT-89 over-molded plastic package
- Extreme ruggedness: handles > 65:1 VSWR
- Product Longevity program: warranted availability until 2030



Available Reference Circuits

Board Frequency (MHz)	Power (W P1dB)	Gain (dB)	Drain Eff. (%)	PCB Size
134-176	3.4 CW	17.3	67.3	0.83” x 1.86”
350-520	3.4 CW	15.3	75.4	0.83” x 1.86”

Freescale Solutions: Airfast Mobile Radio Devices

Features include

- Best ruggedness in the industry:
  - LDMOS devices handle > 65:1 VSWR with 3 dB overdrive
- High gain
  - Eliminates stages, reducing system cost
  - AFIC901N includes 2 amplification stages
- High efficiency
  - Allows use of smaller heatsinks and housings
  - Less heat improves reliability
- Broadband capability
  - Enables full performance across each PMR band
  - Slightly reduced performance across multiple bands
- Available in cost-effective plastic packages
- Freescale product longevity program

Freescale announces the **AFT05MS003N** 3 W device and **AFIC901N** 1 W two-stage device for handheld/portable applications. These new devices offer high performance at a lower power level and lower price point and join the previous announced devices in the Freescale mobile radio portfolio. These devices are designed for mobile applications operating at frequencies from 136 to 941 MHz.

These devices provide significantly improved performance over previous generation devices.

High gain enables reduction in the number of stages. Efficiency improvements dramatically reduce heatsink size. Ruggedness enables reliable operation in extreme environments.

Recently announced products

AFT05MS006N – in production

AFT09MS007N – in production

AFT09MS015N – in production

AFT05MS031N – in production

AFT09MS031N – in production

AFT09MP055N – in production

AFT05MP075N – in production

AFT05MS004N - in production

freescale Airfast RF

Product Features for Handheld Applications

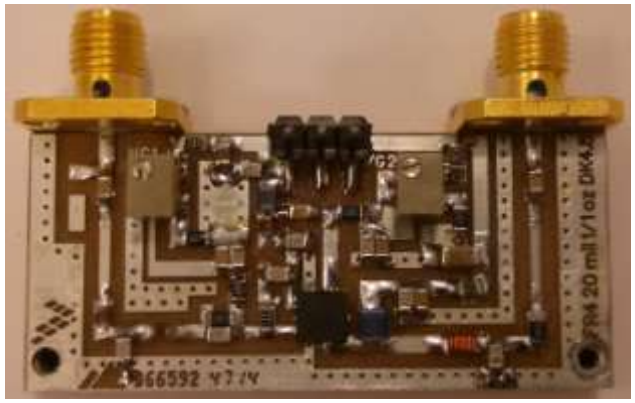
Designed for 7.5 V and 3.6 V Operation at Frequencies between 136–941 MHz

	AFIC901N	AFT05MS003N	AFT05MS004N	AFT05MS006N	AFT09MS007N
	• 136 to 941 MHz • > 1 W output power at 7.5 V • 2-stage LDMOS • Ruggedness > 65:1 VSWR • High gain • QFN 4 × 4 package	• 136 to 941 MHz • > 3 W output power at 7.5 V • Ruggedness > 65:1 VSWR • High gain • SOT-89 package	• 136 to 941 MHz • > 5 W output power at 7.5 V • > 2 W output power at 3.6 V • Ruggedness > 65:1 VSWR • High gain < 0.02 W drive for rated power out • SOT-89 package	• 136 to 941 MHz • > 6 W output power at 7.5 V • Ruggedness > 65:1 VSWR • High gain < 0.02 W drive for rated power out • Over-molded plastic package: PLD-1.5W	• 136 to 941 MHz • > 7 W output power at 7.5 V • 3 W output power at 3.6 V • Ruggedness > 65:1 VSWR • High gain < 0.025 W drive for rated power out • Over-molded plastic package: PLD-1.5W
*Package images not actual size					

AFIC901N Reference Circuit – 1 W @ 135–175 MHz

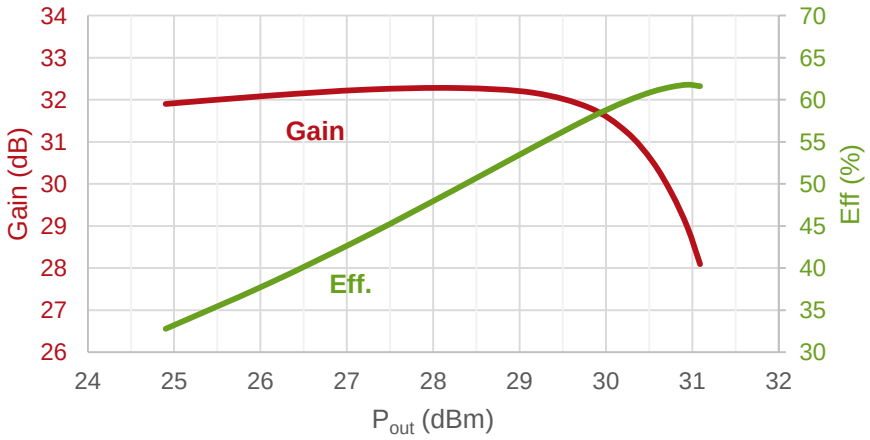
- Typical performance:
  - V_{DD} = 7.5 V, P_{in} = 0 dBm

Freq (MHz)	P_{out} (dBm)	Gain (dB)	Eff. (%)
135	30.3	30.3	65.4
155	30.7	30.7	63.2
175	30.6	30.6	61.7

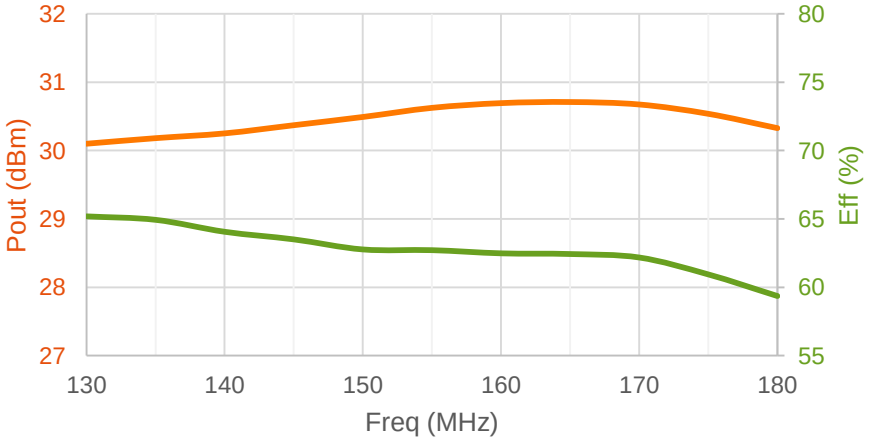


PCB size: 0.83” x1.88” (21 cm x 4.8 cm)

Drive-up @ 175 MHz



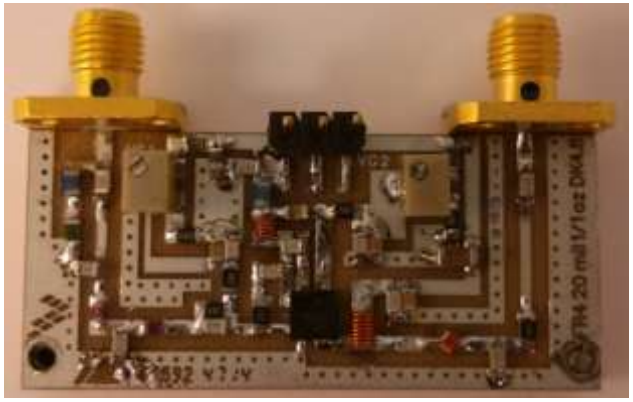
Wideband CW performance @ P_{in} = 0 dBm



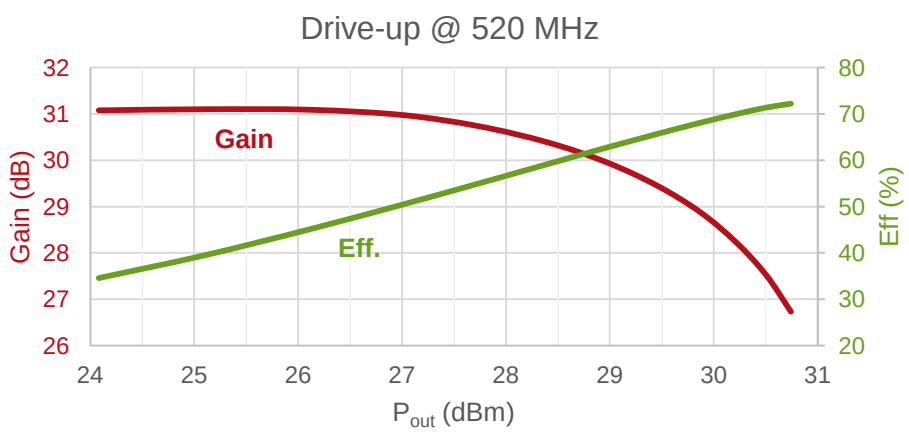
AFIC901N Reference Circuit – 1 W @ 350–520 MHz

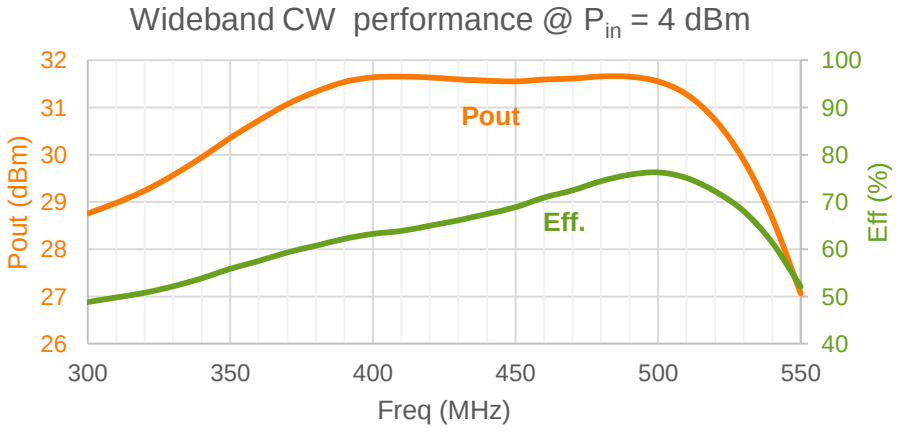
- Typical performance:
  - V_{DD} = 7.5 V, P_{in} = 4.0 dBm

Freq (MHz)	P_{out} (dBm)	Gain (dB)	Eff. (%)
350	30.4	26.4	55.9
435	31.6	27.6	66.8
520	30.7	26.8	72.2



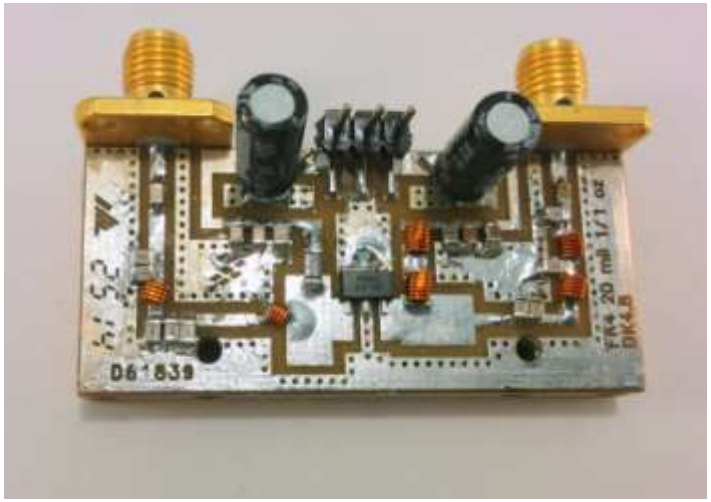
PCB size: 0.83” x 1.88” (21 cm x 4.8 cm)



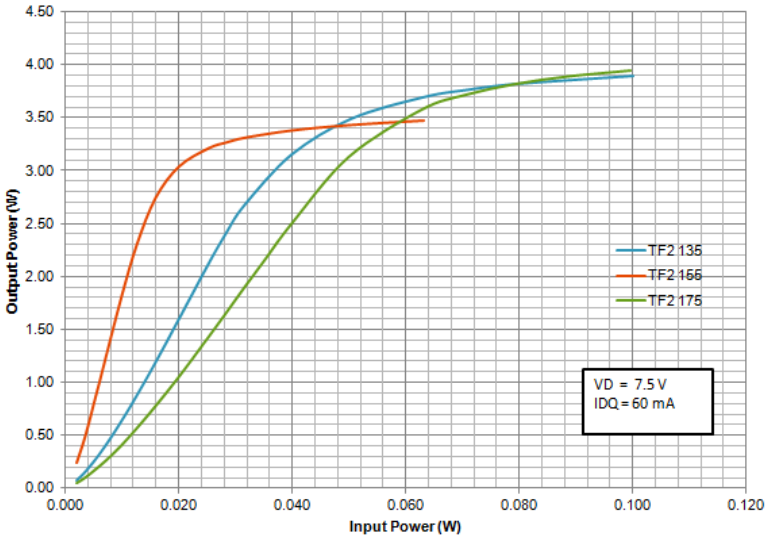


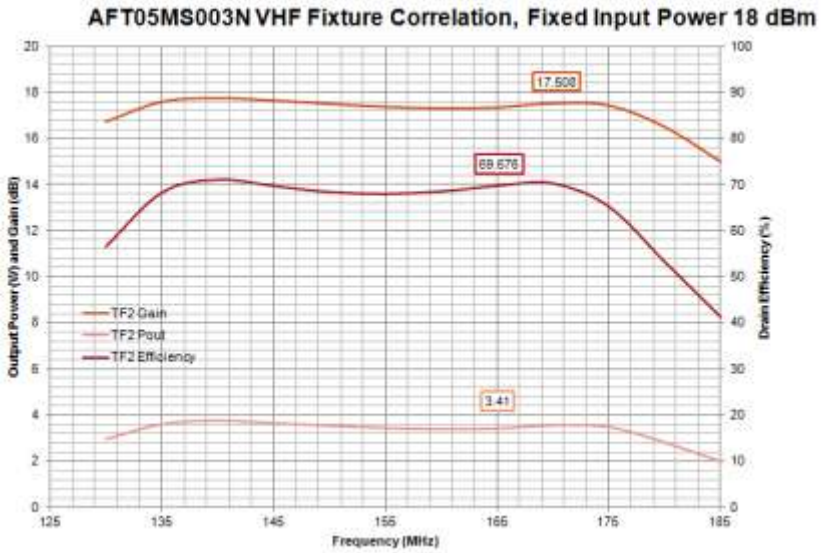
05MS003N Reference Circuit – 3 W @ 135–175 MHz

- Frequency band: 135-175 MHz
- V_{DD} = 7.5 V
- Typical performance:
  - P_{out}: 3.4 W
  - Efficiency: 67.3%
  - Gain: 17.3 dB



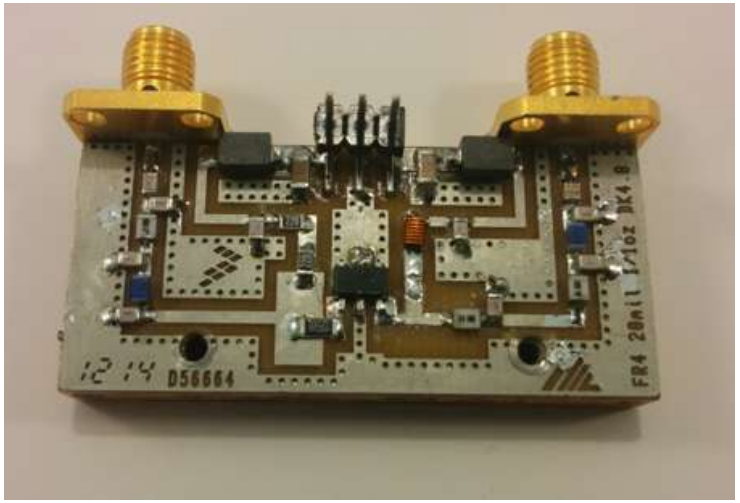
Size: 0.83 " x 1.86" (2.1 cm x 4.7 cm)



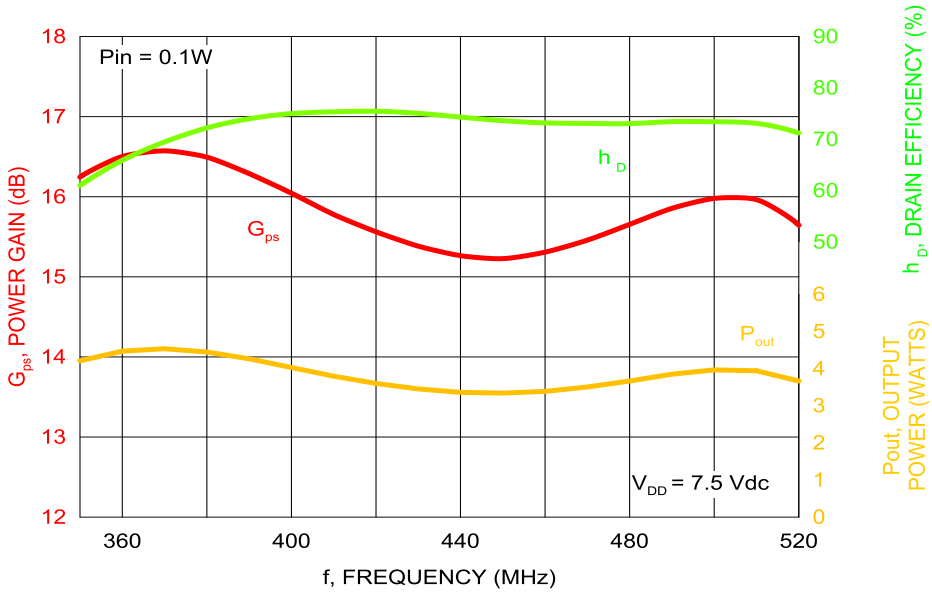


05MS003N Reference Circuit – 3 W @ 350–520 MHz

- Frequency band: 350-520 MHz
- V_{DD} = 7.5 V
- Typical performance:
  - P_{out}: > 3 W
  - Efficiency: 75.4%
  - Gain ≥ 15.3 dB



Size: 0.83" x 1.86" (2.1 cm x 4.7 cm)



www.Freescale.com