Freescale Land Mobile

Airfast Products
AFT05MS031N and AFT09MS031N

June 2012

Land Mobile Challenges

- **Reliability / Ruggedness / Stability**
  - Mission critical applications
  - Harsh, uncontrolled environment
- **Reduce equipment size**
  - Smaller vehicles
  - Reduce installation costs
- **Increase features without increasing size**
  - Reduce installation costs
  - Multi-band / multimode radios

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Why Airfast Land Mobile Transistors

- **Ruggedness, Stability and Reliability**
  - Mission critical applications require mobile transmitters to operate even under non-ideal conditions
    - poorly regulated supply voltage
    - poorly maintained feed lines and antennae
- **Higher efficiency**
  - High efficiency = less heat
  - Lower temperatures improve reliability, key for radios used for mission critical applications
- **Compact circuit size**
  - Reduce radio size to fit “under dash” in smaller cars
  - New, multi band radios, using multiple transmitters without growing radio
- **Linearity**
  - New digital modulation formats require that the amplifier be linear, while still maintaining high efficiency

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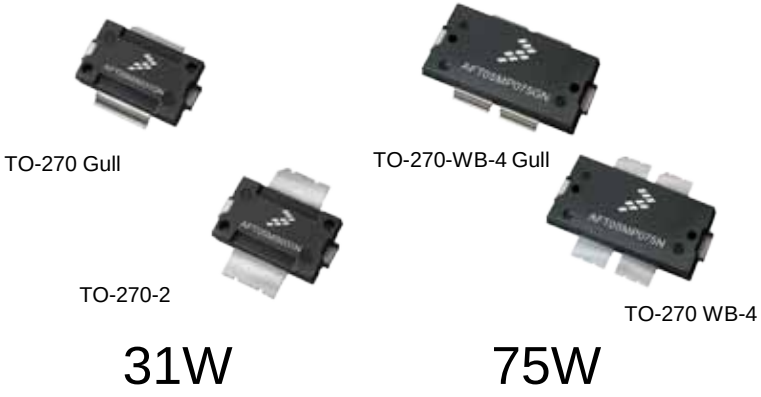
Freescale Solutions: Airfast Land Mobile Devices

The new Freescale Airfast land mobile 31 and 75 watt RF power LDMOS transistors are designed for mobile applications operating at frequencies from 136 to 941 MHz.

These devices provide significantly improved performance over previous generation devices.

Gain improvements enable reduction in the number of stages. Efficiency improvements dramatically reduce heatsink size.

Ruggedness improvements enable reliable operation in extreme environments.



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Features include:

- Best ruggedness in the industry:
  - handles >65:1 VSWR with 3 dB overdrive
- High gain
  - eliminates stages, reducing system cost
- High efficiency
  - allows use of smaller heatsinks and housings
  - less heat improves reliability
- Broadband capability
  - enables full performance across complete LMR band
  - slightly reduced performance across multiple bands.
- Available in standard or surface mount gull wing over-molded plastic packages:
  - AFT05MS031N/GN: TO-270,TO-270-Gull
  - AFT09MS031N/GN: TO-270,TO-270-Gull
  - AFT05MP075N/GN: TO-270-WB-4,TO-270-WB-4 Gull
- Freescale longevity program

AFT05MS031N / AFT09MS031N / AFT05MP075N

Characterized for 12.5V–13.6V operation between 136–941 MHz
Suitable for use in high-reliability radio applications

AFT05MS031N

- 136–520 MHz
- >31W output power
- Ruggedness >65:1 VSWR
- High gain – <½W drive for rated power
- 2 lead over-molded plastic package
  - TO-270-2
  - TO-270-2 Gull

Available NOW!

AFT09MS031N

- 764–941 MHz
- >31W output power
- Ruggedness >65:1 VSWR
- High gain – < 0.6W drive for rated power
- 2 lead over-molded plastic package
  - TO-270-2
  - TO-270-2 Gull

AFT05MP075N

- 136–520 MHz
- >75W output power
- Ruggedness >65:1 VSWR
- High gain –1W drive for rated power
- 4 lead over-molded plastic packages
  - TO-270 WB-4
  - TO-270 WB-4 Gull

Expected Q4'12

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AFT05MS031N Data Sheet

Freescale Semiconductor
Technical Data

Document Number: AFT05MS031N
Rev. 0, 6/2012

RoHS

RF Power LDMOS Transistors

High Ruggedness N-Channel
Enhancement-Mode Lateral MOSFETs

Designed for mobile two-way radio applications with frequencies from 136 to 520 MHz. The high gain, ruggedness and broadband performance of these devices make them ideal for large-signal, common source amplifier applications in mobile radio equipment.

Typical Performance: (13.6 Vdc, T_A = 25°C, CW)

Frequency (MHz)	G_{ps} (dB)	η_D (%)	P1dB (W)
380–450 (1,3)	18.3	64.1	31
450–520 (2,3)	17.7	62.0	31
520 (4)	17.7	71.4	33

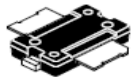
Load Mismatch/Ruggedness

Frequency (MHz)	Signal Type	VSWR	P_{out} (W)	Test Voltage	Result
520 (4)	CW	>65:1 at all Phase Angles	47 (3 dB Overdrive)	17	No Device Degradation

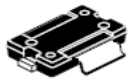
1. Measured in 380–450 MHz UHF wideband reference circuit.
2. Measured in 450–520 MHz UHF wideband reference circuit.
3. The values shown are the minimum measured performance numbers across the indicated frequency range.
4. Measured in 520 MHz narrowband test circuit.

AFT05MS031NR1
AFT05MS031GNR1

136–520 MHz, 31 W, 13.6 V
WIDEBAND
RF POWER LDMOS TRANSISTORS



TO-270-2
PLASTIC
AFT05MS031NR1



TO-270-2 GULL
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AFT05MS031GNR1

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AFT09MS031N Data Sheet

Freescale Semiconductor
Technical Data

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Rev. 0, 5/2012

RoHS

RF Power LDMOS Transistors

High Ruggedness N-Channel
Enhancement-Mode Lateral MOSFETs

Designed for mobile two-way radio applications with frequencies from 764 to 941 MHz. The high gain, ruggedness and broadband performance of these devices make them ideal for large-signal, common source amplifier applications in mobile radio equipment.

Narrowband Performance (13.6 Vdc, I_{DQ} = 500 mA, T_A = 25°C, CW)

Frequency (MHz)	G_{ps} (dB)	η_D (%)	P1dB (W)
764	18.0	74.1	32
870	17.2	71.0	31
941	15.7	68.1	31

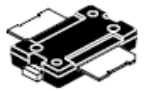
800 MHz Broadband Performance (13.6 Vdc, I_{DQ} = 100 mA, T_A = 25°C, CW)

Frequency (MHz)	G_{ps} (dB)	η_D (%)	P1dB (W)
760	15.7	62.0	44
820	15.7	63.0	37
870	15.5	61.0	36

Load Mismatch/Ruggedness

AFT09MS031NR1
AFT09MS031GNR1

764-941 MHz, 31 W, 13.6 V
WIDEBAND
RF POWER LDMOS TRANSISTORS



TO-270-2
PLASTIC
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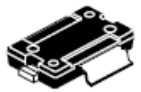

TO-270-2 GULL
PLASTIC
AFT09MS031GNR1

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