RF Power Products

Broadcast Solutions Customer Training

MRFE6VP8600H

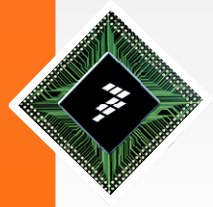
September 2011

www.freescale.com/RFbroadcast

Television Broadcaster Challenges

- **Over the air broadcast is "real"**
  - Mandated by the FCC
  - HDTV deployments are happening now
- **Coverage area is key**
  - More power means more coverage
- **Need for energy efficient equipment has become even more important**
  - Direct impact of network operator OpEx
  - Energy costs are on the rise
  - RF transistor device efficiency dominates overall system efficiency

Why High Ruggedness High Power RF Power Transistors

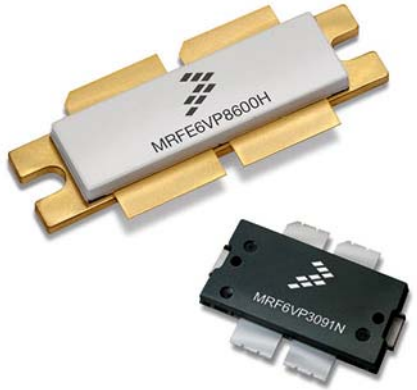


Need for higher power……

- The industry trend over the past four years has been to increase the power delivered while maintaining or reducing the mechanical footprint
- Increasing demand for high powered transmitters with maximum efficiency is driving a trend towards higher powered single devices to minimize transmitter size and complexity
- In wideband systems the modulated signals when amplified by a RF power transistor create spectral distortion thus presenting significant challenges to the digital predistortion (DPD) system used to linearize the signals
- The ruggedness of the power transistor may also be compromised
- Spectrum allocations are more tightly controlled than ever, requiring extremely high performance filtering to be put on the transmitter which can cause stresses

Freescale Solutions High Ruggedness High Power RF Power Transistors

Freescale's new product, MRFE6VP8600H, contains innovations that enhance the ruggedness, improve power density and total power output while maintaining exceptional gain, efficiency and broadband performance, making them ideal for next generation UHF Digital transmitter systems.



Features include:

- Delivers 125W Avg. DVB-T (8k OFDM) output power at 50V. Capable of handling >65:1 VSWR with 3 dB overdrive.
- Broadband 470 - 860 MHz operation
- 19 dB gain at 860 MHz, DVB-T
- 30% efficiency at 860 MHz, DVB-T
- 600W P1dB
- Push-pull device
- Housed in ultra low R_{TH} air cavity ceramic NI-1230/S packages
- Extended negative gate-source voltage range (-6V to +10V). Improves Class C performance, e.g. in a Doherty peaking stage. Enables fast, easy and complete shutdown of the amplifier.

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Key Product Features

MRFE6VP8600H

MRFE6VP8600HS

125W DVB-T avg. Output Power

600W Output Power

- **Broadband 470 – 860 MHz operation**
  - Full performance across complete UHF television spectrum
- **50V Operation**
- **Integrated high performance ESD protection**
- **125W DVB-T avg. output power**
  - Gain: 19 dB
  - Efficiency: 30%
  - Rugged: handles VSWR >65:1
    - 3 dB overdrive (240W avg.)

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MRFE6VP8600H Data Sheet

Freescale Semiconductor
Technical Data

Document Number: MRFE6VP8600H
Rev. 0, 9/2011

RoHS

RF Power LDMOS Transistors

High Ruggedness N-Channel
Enhancement-Mode Lateral MOSFETs

Optimized for broadband operation from 470 to 860 MHz. Device has an integrated input matching network for better power distribution. These devices are ideally suited for use in analog or digital television transmitters.

- Typical Narrowband Performance: V_{DD} = 50 Volts, I_{DQ} = 1400 mA, Channel Bandwidth = 8 MHz, Input Signal PAR = 9.5 dB @ 0.01% Probability on CCDF. ACPR measured in 7.61 MHz Signal Bandwidth @ ±4 MHz Offset with an Integration Bandwidth of 4 kHz.

Signal Type	P_{out} (W)	f (MHz)	G_{ps} (dB)	η_D (%)	ACPR (dBc)	IRL (dB)
DVB-T (8k OFDM)	125 Avg.	860	19.3	30.0	-60.5	-12

- Typical Pulsed Broadband Performance: V_{DD} = 50 Volts, I_{DQ} = 1400 mA, Pulsed Width = 100 µsec, Duty Cycle = 10%

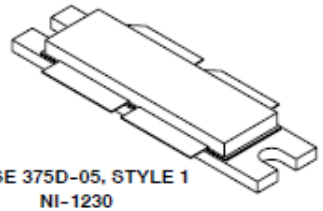
Signal Type	P_{out} (W)	f (MHz)	G_{ps} (dB)	η_D (%)
Pulsed	600 Peak	470	19.3	47.1
		650	20.0	53.1
		860	18.8	48.9

Features

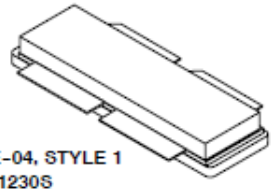
- Capable of Handling >65:1 VSWR through all Phase Angles @ 50 Vdc, 860 MHz, DVB-T (8k OFDM) 240 Watts Avg. Output Power (3 dB Input Overdrive from Rated P_{out})
- Exceptional Efficiency for Class AB Analog or Digital Television Operation
- Full Performance across Complete UHF TV Spectrum, 470-860 MHz
- Capable of 600 Watt CW Output Power with Adequate Thermal Management
- Integrated Input Matching

MRFE6VP8600HR6
MRFE6VP8600HR5
MRFE6VP8600HSR6
MRFE6VP8600HSR5

470-860 MHz, 600 W, 50 V
LDMOS BROADBAND
RF POWER TRANSISTORS



CASE 375D-05, STYLE 1
NI-1230
MRFE6VP8600HR6



CASE 375E-04, STYLE 1
NI-1230S
MRFE6VP8600HSR6

PARTS ARE PUSH-PULL

http://www.freescale.com/files/rf_if/doc/data_sheet/MRFE6VP8600H.pdf

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