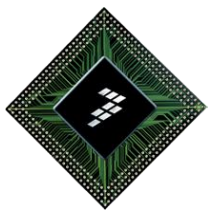
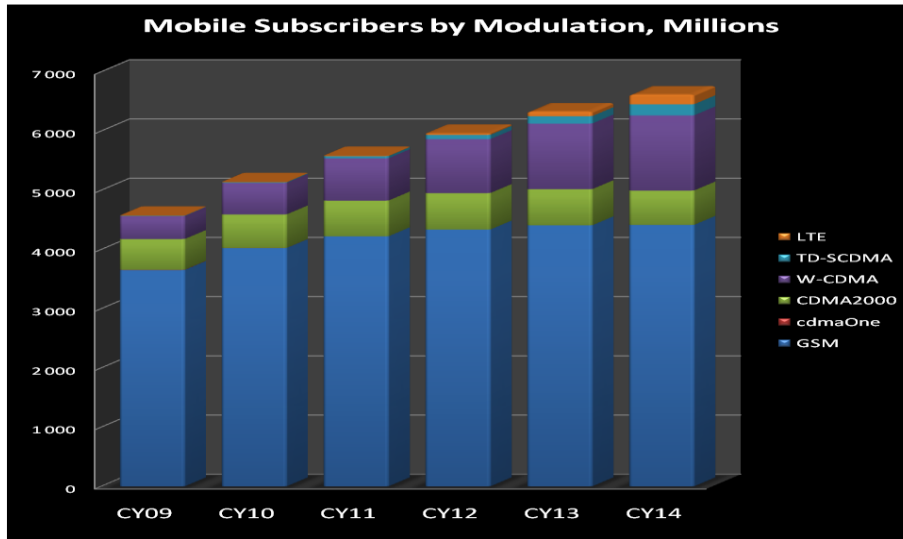


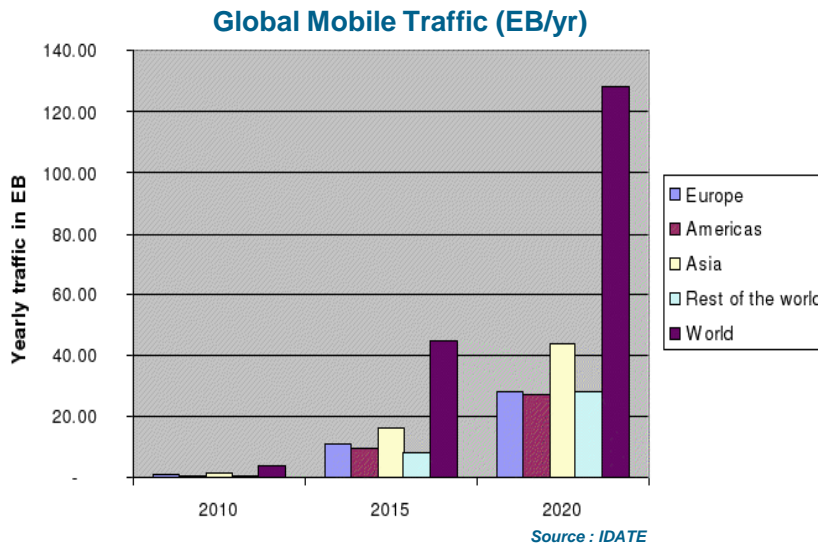
Freescal enables smaller size base stations with high efficiency, wide bandwidth power amplifier products



Mobile Network Operator Opportunities & Challenges



- Data uptake with cellular subscribers is increasing exponentially
- To accommodate the need for increased data capacity:
 - Expansion of frequency bands has occurred
 - Signal bandwidth requirements for PAs have increased
 - Need for smaller footprint base stations and CAPEX is driving demand for multi band and multi mode PAs
 - Need for energy efficient equipment has become even more important



Enhanced Video Bandwidth RF Power Transistors

- Need for higher video (instantaneous) bandwidth:
 - Most PAs today have signal bandwidth limitations of 20 MHz
 - Increasing demand for data traffic and equipment consolidation is driving a trend to extend single amplifiers to cover entire wireless frequency bands and beyond
 - In multicarrier wide-band 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

Freescale Solutions for Enhanced Video Bandwidth

- The two new Freescale products, MRF8P20165WHS and MRF8P20140WHS, contain innovations that extend the instantaneous signal bandwidth to an industry leading 160 MHz, making them ideal for next generation systems that support multiple carrier, multi-mode and multi-band amplifiers.
- Other features include:
 - Dual path design allows Doherty implementation in a single package
 - The transistors are internally matched for simplified assembly, are extremely rugged and can produce their rated power into a 10:1 VSWR at 30 Vdc.
 - Both parts are housed in Freescale's NI-780/S-4 air-cavity packages and have integrated electrostatic discharge (ESD) protection that makes them more resistant to stray voltage encountered on assembly lines
 - Broad range gate voltage range of -6 to +10V increases their performance when operating in Class C mode

MRF8P20140WHS



2 x 70 W Rated Power

Minimum instantaneous bandwidth: 1880-2025 MHz

At average power of 24W

- Gain: 16 dB
- Drain Efficiency: 43.7%
- ACPR: -32.6 dBc

MRF8P20165WHS



2 x 80 W Rated Power

Minimum instantaneous bandwidth: 1930-1995 MHz

At average power of 37W

- Gain: 16.3 dB
- Drain Efficiency: 47.7%
- ACPR: -29.7 dBc

Freescale Semiconductor
Technical Data

Document Number: MRF8P20140WH
Rev. 0, 4/2011



RF Power Field Effect Transistors

N-Channel Enhancement-Mode Lateral MOSFETs

Designed for CDMA base station applications with frequencies from 1880 to 2025 MHz. Can be used in Class AB and Class C for all typical cellular base station modulation formats.

- Typical Doherty Single-Carrier W-CDMA Performance: $V_{DD} = 28$ Volts, $I_{DQA} = 500$ mA, $V_{GSB} = 1.2$ Vdc, $P_{out} = 24$ Watts Avg., IQ Magnitude Clipping, Channel Bandwidth = 3.84 MHz, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

Frequency	G_{ps} (dB)	η_D (%)	Output PAR (dB)	ACPR (dBc)
1880 MHz	16.0	42.8	8.0	-31.0
1920 MHz	16.0	43.7	8.1	-32.6
2025 MHz	15.9	42.0	8.1	-31.2

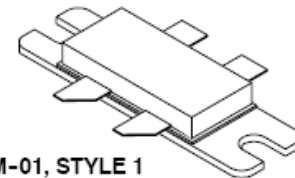
- Capable of Handling 10:1 VSWR, @ 30 Vdc, 1920 MHz, 160 Watts CW ⁽¹⁾ Output Power (3 dB Input Overdrive from Rated P_{out})
- Typical P_{out} @ 3 dB Compression Point \approx 170 Watts ^(1,2)

Features

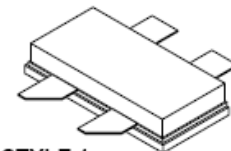
- Designed for Wide Instantaneous Bandwidth Applications. $VBW_{res} \approx 240$ MHz.
- Designed for Wideband Applications that Require 160 MHz Signal Bandwidth
- Production Tested in a Symmetrical Doherty Configuration
- 100% PAR Tested for Guaranteed Output Power Capability
- Characterized with Large-Signal Load-Pull Parameters and Common Source S-Parameters
- Internally Matched for Ease of Use
- Integrated ESD Protection

MRF8P20140WHR3
MRF8P20140WHSR3

1880-2025 MHz, 24 W AVG., 28 V
SINGLE W-CDMA
LATERAL N-CHANNEL
RF POWER MOSFETs



CASE 465M-01, STYLE 1
NI-780-4
MRF8P20140WHR3



CASE 465H-02, STYLE 1
NI-780S-4
MRF8P20140WHSR3

Link to Data Sheet: http://www.freescale.com/files/rf_if/doc/data_sheet/MRF8P20140WH.pdf

Freescale Semiconductor
Technical Data

Document Number: MRF8P20165WH
Rev. 0, 4/2011



RF Power Field Effect Transistors

N-Channel Enhancement-Mode Lateral MOSFETs

Designed for base station applications with wide instantaneous bandwidth requirements covering frequencies from 1880 to 2025 MHz.

- Typical Doherty Single-Carrier W-CDMA Performance: $V_{DD} = 28$ Volts, $I_{DQA} = 550$ mA, $V_{GSB} = 1.3$ Vdc, $P_{out} = 37$ Watts Avg., IQ Magnitude Clipping, Channel Bandwidth = 3.84 MHz, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

Frequency	G_{ps} (dB)	η_D (%)	Output PAR (dB)	ACPR (dBc)
1930 MHz	16.1	47.0	7.1	-27.7
1960 MHz	16.3	47.7	7.1	-29.7
1995 MHz	16.3	46.0	7.0	-33.3

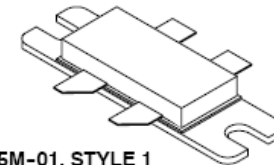
- Capable of Handling 10:1 VSWR, @ 32 Vdc, 1960 MHz, 173 Watts CW Output Power (2 dB Input Overdrive from Rated P_{out})
- Typical P_{out} @ 3 dB Compression Point \approx 190 Watts (1)

Features

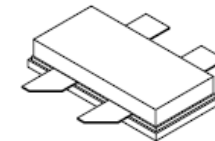
- Designed for Wide Instantaneous Bandwidth Applications. $VBW_{res} \approx 100$ MHz.
- Designed for Wideband Applications that Require 65 MHz Signal Bandwidth
- Production Tested in a Symmetrical Doherty Configuration
- 100% PAR Tested for Guaranteed Output Power Capability
- Characterized with Large-Signal Load-Pull Parameters and Common Source S-Parameters
- Internally Matched for Ease of Use
- Integrated ESD Protection
- Greater Negative Gate-Source Voltage Range for Improved Class C Operation
- Designed for Digital Predistortion Error Correction Systems
- RoHS Compliant

MRF8P20165WHR3
MRF8P20165WHSR3

1930-1995 MHz, 37 W AVG., 28 V
SINGLE W-CDMA
LATERAL N-CHANNEL
RF POWER MOSFETs



CASE 465M-01, STYLE 1
NI-780-4
MRF8P20165WHR3



CASE 465H-02, STYLE 1
NI-780S-4
MRF8P20165WHSR3

Link to Data Sheet: http://www.freescale.com/files/rf_if/doc/data_sheet/MRF8P20165WH.pdf

