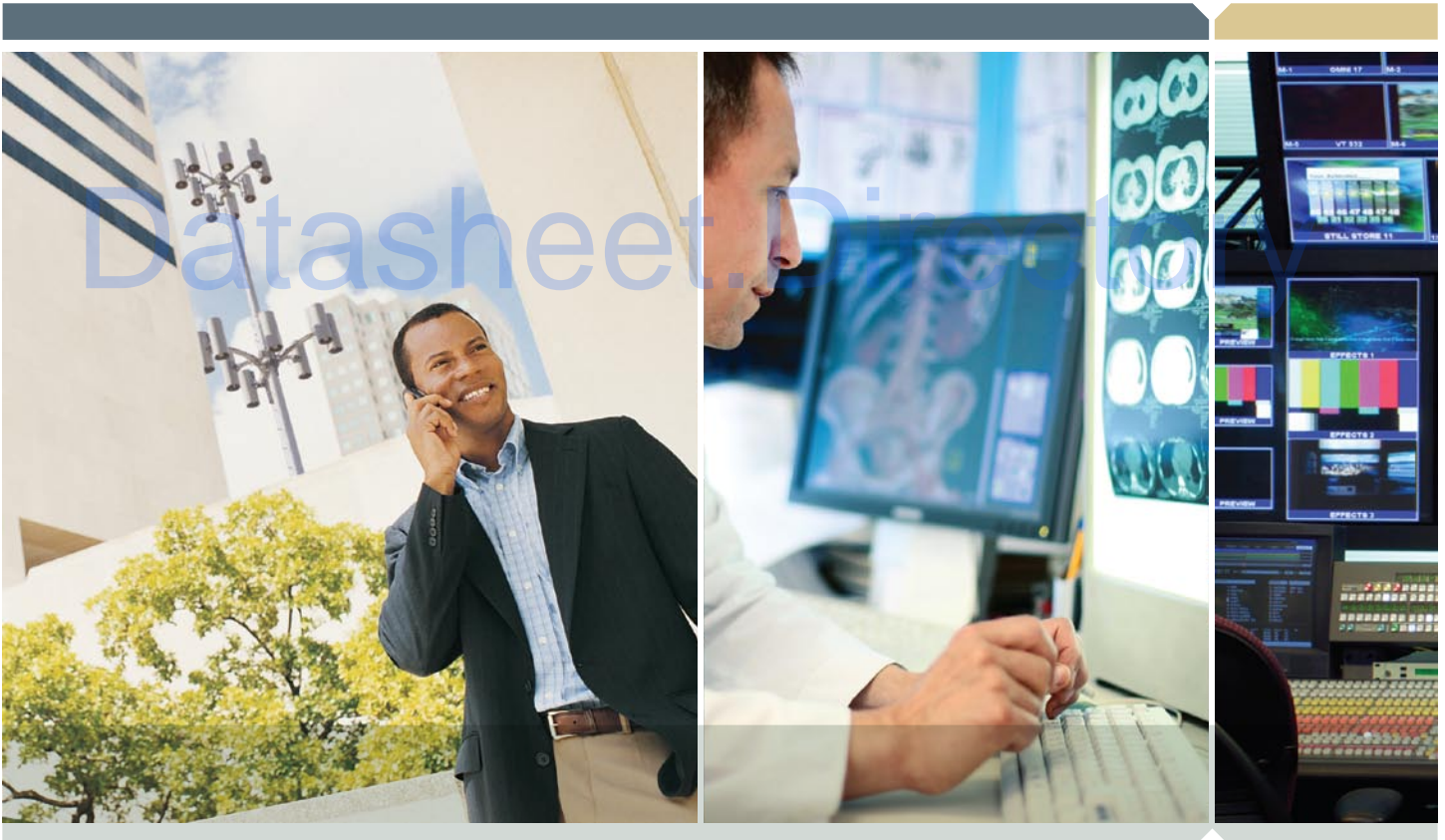


RF Products

Freescale Semiconductor Selector Guide



RF Product Selector Guide

Offering a broad portfolio of RF products, Freescale Semiconductor primarily serves the wireless infrastructure, wireless subscriber, general purpose amplifier, broadcast and industrial markets. Freescale pioneered RF technology and continues to be the leader in the field by providing the quality, reliability and consistency that is associated with our RF products. Our products enable developers to create cost-effective, high-performance, innovative designs. Freescale RF Solutions supports these developers through unequaled integration, ease of use, the most comprehensive RF toolkit in the industry and access to our global support team. Freescale is committed to developing new products and expanding our product offerings to meet the increasing demands of ISM band and personal communication systems, including cellular phone, broadband data, WiMAX, TV broadcast, land mobile and various industrial applications.

How to Use This Selector Guide

The RF Low Power Components, LDMOS Power Transistors, GaAs Power Transistors, Power Amplifier ICs and Modules and General Purpose Amplifiers are FIRST divided into major categories by frequency band. SECOND, within each category, parts are listed by power level. THIRD, within a frequency band, transistors are further grouped by operating voltage and, finally, output power.

Applications Assistance

Applications assistance is only a phone call away — call the nearest Freescale Semiconductor Sales office or 1-800-521-6274.

Access Data On-Line!

Use the Internet to access semiconductor product data at <http://www.freescale.com> or <http://www.freescale.com/rf>. This web site provides you with instant access to parametric search, part number search, product summary pages, data sheets, selector guide information, application information, design tools, package outlines, on-line technical support and much more.

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Access Data On-Line!

Available online are Part Number Search, the Product Library, Documentation Library, Tools Library, Application sites, Product sites, Technical Helpline, Technical Training and Where to Buy at the following URL:

<http://www.freescale.com>.

See the RF Design Resource site at <http://www.freescale.com/rf> for specific RF Product support information for:

- Data sheets
- Applications notes
- Selector guides
- Packaging information
- Application information
- Models
- Circuit board artwork
- Press releases
- Events

Design Tools and Data Available On-Line for Your Design-in Process

RF High Power Models

Freescale Semiconductor continues to populate its RF High Power Model Library with MET and Root models. All product models available in the RF High Power Model Library (Root and MET) include package, bond wire and internal matching network effects.

The MET model for RF High Power transistors and RF ICs is a nonlinear model that examines both electrical and thermal phenomena and can account for dynamic self-heating effects of device performance. It is specifically tailored to model high power RF transistors and RF ICs used in wireless base station applications.

Implemented in the Agilent® EEsof® EDA Advanced Design System, APLAC® Analog Design Tool, Applied Wave Research Microwave Office™, Ansoft® Serenade Design Environment and Eagleware-Elanix GENESYS™ Microwave and RF Design Suite, the MET model is capable of performing small-signal, large-signal, harmonic-balance, noise and transient simulations. Because of its ability to simulate self-heating effects, the MET model is more accurate than existing models, enabling circuit designers to predict prototype performance more accurately and reduce design cycle time.

The current release of the MET model is available for these tools:

- Agilent EEsof ADS® (UNIX, PC and Red Hat® Linux®) nonlinear circuit simulator
- APLAC Analog Design Tool

- Applied Wave Research Microwave™ Office
- Ansoft Serenade Design Environment
- Eagleware-Elanix GENESYS Microwave and RF Design Suite

The RF High Power Model Library is available for all major computer platforms supported by these simulators.

For more information and latest releases supported, go to

<http://www.freescale.com/rf/models>.

RF Power Electromigration MTTF Calculation Program

Program Functionality

This MTTF/FIT calculator software is designed to assist our customers in estimating the LDMOS device reliability in terms of electromigration wear-out failures. The program evaluates LDMOS device Median-Time-To-Failure (MTTF) using Black's Equations. It also estimates the Failures-in-Time (FIT) value at the expected base station transceiver system (BTS) life span.

About the Program

This program is designed for estimating LDMOS device electromigration failure rate. According to electromigration theory, there are two wear-out modes for silicon components employing aluminum as a metallization material:

- The formation of an electrically open circuit due to the condensation of vacancies in the aluminum to form voids.
- The growth of etch-pits into silicon by the dissolution of silicon into aluminum (to short out an underlying junction).

The program also estimates the FIT value at the expected base BTS life span. The calculation requires input for the drain voltage, drain currents, case temperature, RF input/output power and expected BTS life.

MTTF Calculator Availability

RF Power MTTF calculators are being added to the Freescale Semiconductor web site for all RF Power LDMOS discrete transistor and IC devices. Go to <http://www.freescale.com/rf> and select Software & Tools/Development Tools/Calculators.

Literature Centers

Printed literature can be obtained from the Literature Centers upon request. For those items that incur a cost, the U.S. Literature Center will accept Master Card and Visa.

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Low Power RF Components

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Low Power RF Components

Amplifiers

Product	RF Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Standby Current μ A (Typ)	Small Signal Gain dB (Typ)	Output IP3 dBm (Typ)	NF dB (Typ)	Packaging	System Applicability
MBC13720NT1 ^(18c)	400 to 2500	2.5 to 3.0	9.0	<20	14.5 @ 1900 MHz	24.5 @ 1900 MHz	1.38 @ 1900 MHz	419B/SOT-363	ISM900, 2400, PCS, CDMA, DVB-H
MBC13916NT1 ^(18c)	100 to 2500	2.7 to 5.0	4.7	—	19 @ 900 MHz	16.5 @ 900 MHz	0.9 @ 900 MHz	1404/SOT-343R	General Purpose Cascode Amp for VCOs, Buffers, & LNAs
MC13821 ^(18b)	800 to 2500	2.7 to 3.0	2.8	10	18 @ 1575 MHz	18.5 @ 1575 MHz	1.2 @ 1575 MHz	1345/QFN-12	ISM900, ISM2400, GPS, Cellular, PCS, W-CDMA

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

Low Power RF Components Packages



CASE 419B
(SOT-363)



CASE 1345
(QFN-12)



CASE 1404
(SOT-343R)

SCALE 1:1

RF Transistors

Freescale Semiconductor⁽¹⁾ continues to be the industry leader in RF transistor technology. Our current portfolio ranges from high gain and low noise devices at microwave frequencies to high power devices for fixed RF and microwave applications. Technical innovation combined with world-class manufacturing capability allows Freescale to offer world class product, service and support to its customers.

From our LDMOS and GaAs portfolio, the user can choose from a variety of packages. They include over-molded plastic and air cavity that are microstrip circuit compatible or surface mountable. Many are designed for automated assembly equipment.

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(1) The Semiconductor Products sector of Motorola, Inc. became Freescale Semiconductor, Inc. in 2004.

RF Industrial, Scientific and Medical Power Transistors

Freescall Semiconductor has expanded its portfolio of RF Power devices into the Industrial, Scientific and Medical (ISM) market. New transistors are being introduced that are designed for both the HF/VHF frequency space (to 600 MHz) and the 2.45 GHz ISM band. Applications include Plasma generators, FM/TV broadcast, Magnetic Resonance Imaging (MRI), CO₂ lasers, RF Heating and many other industrial-based applications. Key technology innovations to this family are the use of VHV6 LDMOS, a 50 V enhancement to Freescall's widely accepted 28 V LDMOS technology.

VHV6 LDMOS technology allows for a much higher power density and RF performance levels that exceed existing ISM products in the market. For example, these devices have the highest gain figures in the industry, which allows for less gain stages, saving cost of pre-drivers and board space. The introduction of three new parts to the ISM portfolio with a 1 kW peak rating now provides solutions from 10 W to 1 kW.

Table 1. HF/VHF - To 600 MHz

Product	Frequency Band ⁽³⁷⁾		P _{out} Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style
	U	MHz							
MRF6VP11KHR6 ^(18o) ★	U	10-150	1000 Peak	Pulsed	50	26/130	71	0.03	375D/1 (NI-1230)
MRF6VP21KHR6 ^(18o) ★	U	10-235	1000 Peak	Pulsed	50	24/235	67.5	0.03	375D/1 (NI-1230)
MRF6VP41KHR6 ^(18o) ★	U	10-450	1000 Peak	Pulsed	50	20/450	64	0.03	375D/1 (NI-1230)
MRF6VP41KHSR6 ^(18o)	U	10-450	1000 Peak	Pulsed	50	20/450	64	0.03	375E/1 (NI-1230S)
MRF6V2010NR1 ^(18a)	U	10-450	10 CW	1-Tone	50	23.9/220	62	3.0	1265/1 (TO-270-2)
MRF6V2010NBR1 ^(18a)	U	10-450	10 CW	1-Tone	50	23.9/220	62	3.0	1337/1 (TO-272-2)
MRF6V2150NR1 ^(18a)	U	10-450	150 CW	1-Tone	50	25/220	68.3	0.24	1486/1 (TO-270 WB-4)
MRF6V2150NBR1 ^(18a)	U	10-450	150 CW	1-Tone	50	25/220	68.3	0.24	1484/1 (TO-272 WB-4)
MRF6V2300NR1 ^(18a)	U	10-600	300 CW	1-Tone	50	25.5/220	68	0.24	1486/1 (TO-270 WB-4)
MRF6V2300NBR1 ^(18a)	U	10-600	300 CW	1-Tone	50	25.5/220	68	0.24	1484/1 (TO-272 WB-4)
MRF6VP2600HR6 ^(18o) ★	U	10-250	125 AVG	OFDM	50	25/225	28.5	0.20	375D/1 (NI-1230)

Table 2. ISM Band - 2.45 GHz

Product	Frequency Band ⁽³⁷⁾		P _{out} Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style
	I/O	MHz							
MW6IC2420NBR1 ^(18a)	I/O	2450	20 CW	1-Tone	28	19.5/2450	27	1.8	1329/- (TO-272 WB-16)
MRF6S24140HR3 ⁽¹⁸ⁱ⁾	I/O	2450	140 CW	1-Tone	28	13.2/2450	45	0.29	465B/1 (NI-880)
MRF6S24140HSR3 ⁽¹⁸ⁱ⁾	I/O	2450	140 CW	1-Tone	28	13.2/2450	45	0.29	465C/1 (NI-880S)
MRF6P24190HR6 ^(18o)	I/O	2450	190 CW	1-Tone	28	13.2/2450	46.2	0.22	375D/1 (NI-1230)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

★New Product

RF LDMOS Power Transistors

Freescale Semiconductor LDMOS technology is ideally suited for RF power amplifier applications. Several families of products have been targeted for specific markets including VHF and UHF portable/land mobile, 900 MHz linear cellular, GSM, TDMA and CDMA, digital television, GSM EDGE, PCS, UMTS, and W-CDMA.

With the unique LDMOS characteristics, these parts offer superior thermal performance. This is due to the simplified package design, which offers excellent Class AB intermodulation performance under medium peak-to-average ratios providing a superior device choice for advanced digital modulations formats or high gain applications.

Table 1. Mobile - To 520 MHz

Designed for broadband VHF and UHF commercial and industrial applications. The high gain and broadband performance of these devices make them ideal for large-signal, common-source amplifier applications in 12.5/7.5 volt mobile, portable and base station operation.

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
VHF & UHF, Land Mobile Radio, Class AB									
MRF1513NT1 ^(18f)	U	400-520	3 CW	1-Tone	7.5/12.5	15/520	65	4.0	466/1 (PLD 1.5)
MRF1511NT1 ^(18f)	U	135-175	8 CW	1-Tone	7.5	13/175	70	2.0	466/1 (PLD 1.5)
MRF1517NT1 ^(18f)	U	430-520	8 CW	1-Tone	7.5	14/520	70	2.0	466/1 (PLD 1.5)
MRF1518NT1 ^(18f)	U	400-520	8 CW	1-Tone	12.5	13/520	60	2.0	466/1 (PLD 1.5)
MRF1535NT1 ^(18j)	U	400-520	35 CW	1-Tone	12.5	13.5/520	55	0.90	1264/1 (TO-272-6 Wrap)
MRF1535FNT1 ^(18j)	U	400-520	35 CW	1-Tone	12.5	13.5/520	55	0.90	1264A/1 (TO-272-6)
MRF1550NT1 ^(18j)	U	135-175	50 CW	1-Tone	12.5	14.5/175	55	0.75	1264/1 (TO-272-6 Wrap)
MRF1550FNT1 ^(18j)	U	135-175	50 CW	1-Tone	12.5	14.5/175	55	0.75	1264A/1 (TO-272-6)
MRF1570NT1 ^(18j)	U	400-470	70 CW	1-Tone	12.5	11.5/470	60	0.75	1366/1 (TO-272-8 Wrap)
MRF1570FNT1 ^(18j)	U	400-470	70 CW	1-Tone	12.5	11.5/470	60	0.75	1366A/1 (TO-272-8)

Table 2. TV Broadcast - To 1000 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
470 - 1000 MHz, Class AB									
MW6S004NT1 ^(18f)	U	1-2000	4 PEP	2-Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW6S010NR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265/1 (TO-270-2)
MW6S010GNR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265A/1 (TO-270-2 Gull)
MRFE6S9045NR1 ^(18a)	U	880	10 AVG	N-CDMA	28	22.1/880	32	1.0	1265/1 (TO-270-2)
MRFE6S9060NR1 ^(18a)	U	880	14 AVG	N-CDMA	28	21.4/880	32.1	0.77	1265/1 (TO-270-2)
MRF377HR3 ^(18b)	I/O	470-860	45 AVG	OFDM	32	18.2/860	23	0.27	375G/1 (NI-860C3)
MRF377HR5 ^(18p)	I/O	470-860	45 AVG	OFDM	32	18.2/860	23	0.27	375G/1 (NI-860C3)
MRFE6P3300HR3 ⁽¹⁸ⁱ⁾	I/O	470-860	270 PEP	2-Tone	32	20.4/860	44.8	0.23	375G/1 (NI-860C3)
MRFE6P3300HR5 ^(18p)	I/O	470-860	270 PEP	2-Tone	32	20.4/860	44.8	0.23	375G/1 (NI-860C3)
MRF6VP3450H ^(46a)	I	470-860	90 AVG	OFDM	50	23/860	28	—	375D/1 (NI-1230)
MRF6VP3450HS ^(46a)	I	470-860	90 AVG	OFDM	50	23/860	28	—	375E/1 (NI-1230S)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

RF LDMOS Power Transistors (continued)

Table 3. Cellular - To 500 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
400 - 500 MHz, Class AB									
MW6S004NT1 ^(18f)	U	1-2000	4 PEP	2-Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW6S010NR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265/1 (TO-270-2)
MW6S010GNR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265A/1 (TO-270-2 Gull)
MRF5S4125NR1 ^(18a)	I	450-480	25 AVG	N-CDMA	28	23/465	30	0.33	1486/1 (TO-270 WB-4)
MRF5S4125NBR1 ^(18a)	I	450-480	25 AVG	N-CDMA	28	23/465	30	0.33	1484/1 (TO-272 WB-4)

Table 4. Cellular - To 1000 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
800 - 1000 MHz, Class AB									
MRF9002NR2 ^(18e)	U	960	(3x) 2 PEP ⁽⁴¹⁾	2-Tone	26	18/960	50	12	978/- (PFP-16)
MW6S004NT1 ^(18f)	U	1-2000	4 PEP	2-Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW6S010NR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265/1 (TO-270-2)
MW6S010GNR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265A/1 (TO-270-2 Gull)
MRFE6S9045NR1 ^(18a)	U	880	10 AVG	N-CDMA	28	22.1/880	32	1.0	1265/1 (TO-270-2)
MRFE6S9060NR1 ^(18a)	U	880	14 AVG	N-CDMA	28	21.4/880	32.1	0.77	1265/1 (TO-270-2)
MRF5S9070NR1 ^(18a)	U	800-900	14 AVG	N-CDMA	26	17.8/880	30	0.8	1265/1 (TO-270-2)
MW5IC970NBR1 ^(18a)	I	800-900	70 PEP	2-Tone	28	30/870	48	5.2/0.8	1329/- (TO-272 WB-16)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴¹⁾Three individual transistors in a single package.

RF LDMOS Power Transistors (continued)

Table 4. Cellular - To 1000 MHz (continued)

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
800 - 1000 MHz, Class AB (continued)									
MRF5S9080NR1 ^(18a)	I	869-960	80 CW	1-Tone	26	18.5/960	60	0.5	1486/1 (TO-270 WB-4)
MRF5S9080NBR1 ^(18a)	I	869-960	80 CW	1-Tone	26	18.5/960	60	0.5	1484/1 (TO-272 WB-4)
MRF5S9100NR1 ^(18a)	I	880	20 AVG	N-CDMA	26	19.5/880	28	0.52	1486/1 (TO-270 WB-4)
MRF5S9100NBR1 ^(18a)	I	880	20 AVG	N-CDMA	26	19.5/880	28	0.52	1484/1 (TO-272 WB-4)
MRF5S9101NR1 ^(18a)	I	869-960	100 CW	1-Tone	26	17.5/960	60	0.41	1486/1 (TO-270 WB-4)
MRF5S9101NBR1 ^(18a)	I	869-960	100 CW	1-Tone	26	17.5/960	60	0.41	1484/1 (TO-272 WB-4)
MRFE6S9125NR1 ^(18a)	I	880	27 AVG	N-CDMA	28	20.2/880	31	0.44	1486/1 (TO-270 WB-4)
MRFE6S9125NBR1 ^(18a)	I	880	27 AVG	N-CDMA	28	20.2/880	31	0.44	1484/1 (TO-272 WB-4)
MRFE6S9130HR3 ^{(18i)★}	I	880	27 AVG	N-CDMA	28	19.2/880	30.5	0.45	465/1 (NI-780)
MRFE6S9130HSR3 ^{(18i)★}	I	880	27 AVG	N-CDMA	28	19.2/880	30.5	0.45	465A/1 (NI-780S)
MRFE6S9135HR3 ^{(18i)★}	I/O	940	39 AVG	W-CDMA	28	21/940	32.3	0.39	465B/1 (NI-880)
MRFE6S9135HSR3 ^{(18i)★}	I/O	940	39 AVG	W-CDMA	28	21/940	32.3	0.39	465C/1 (NI-880S)
MRF5S9150HSR3 ⁽¹⁸ⁱ⁾	I	880	33 AVG	N-CDMA	28	19.7/880	28.4	0.34	465A/1 (NI-780S)
MRFE6S9160HR3 ⁽¹⁸ⁱ⁾	I	880	35 AVG	N-CDMA	28	21/880	31	0.31	465/1 (NI-780)
MRFE6S9160HSR3 ⁽¹⁸ⁱ⁾	I	880	35 AVG	N-CDMA	28	21/880	31	0.31	465A/1 (NI-780S)
MRFE6S9200HR3 ⁽¹⁸ⁱ⁾	I	880	58 AVG	W-CDMA	28	21/880	35	0.29	465B/1 (NI-880)
MRFE6S9200HSR3 ⁽¹⁸ⁱ⁾	I	880	58 AVG	W-CDMA	28	21/880	35	0.29	465C/1 (NI-880S)
MRF8S9200N ^(46c)	I/O	940	58 AVG	W-CDMA	28	18.5/940	36	—	2021/- (OM780-2)
MRFE6S9201HR3 ⁽¹⁸ⁱ⁾	I	880	40 AVG	N-CDMA	28	20.8/880	31.3	0.34	465/1 (NI-780)
MRFE6S9201HSR3 ⁽¹⁸ⁱ⁾	I	880	40 AVG	N-CDMA	28	20.8/880	31.3	0.34	465A/1 (NI-780S)
MRFE6S9205HR3 ⁽¹⁸ⁱ⁾	I/O	880	58 AVG	W-CDMA	28	21.2/880	34	0.27	465B/1 (NI-880)
MRFE6S9205HSR3 ⁽¹⁸ⁱ⁾	I/O	880	58 AVG	W-CDMA	28	21.2/880	34	0.27	465C/1 (NI-880S)
MRFE6P9220H ^(46a)	I/O	880	47 AVG	N-CDMA	28	20/880	28	—	375G/1 (NI-860C3)

Table 5. Cellular - To 1500 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
1470 - 1510 MHz, Class AB									
MRF7S15100H ^(46b)	I/O	1470-1510	23 AVG	W-CDMA	28	18.5/1510	32	—	465/1 (NI-780)
MRF7S15100HS ^(46b)	I/O	1470-1510	23 AVG	W-CDMA	28	18.5/1510	32	—	465A/1 (NI-780S)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

RF LDMOS Power Transistors (continued)

Table 6. General Purpose LDMOS Drivers

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
To 2100 MHz, Class AB									
MW6S004NT1 ^(18f)	U	1-2000	4 PEP	2-Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW6S010NR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265/1 (TO-270-2)
MW6S010GNR1 ^(18a)	U	450-1500	10 PEP	2-Tone	28	18/960	32	2.85	1265A/1 (TO-272-2)
MRF6S20010NR1 ^(18a)	I	1600-2200	10 PEP	2-Tone	28	15.5/2170	36	5.9	1265/1 (TO-270-2)
MRF6S20010GNR1 ^(18a)	I	1600-2200	10 PEP	2-Tone	28	15.5/2170	36	5.9	1265A/1 (TO-270-2 Gull)

Table 7. PCS and 3G - To 2200 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
1800 - 2000 MHz, Class AB (GSM1800, GSM1900, GSM EDGE and W-CDMA)									
MRF6S20010NR1 ^(18a)	I	1805-1990	4 AVG	EDGE	28	16/1805,1880	33	2.5	1265/1 (TO-270-2)
MRF6S20010GNR1 ^(18a)	I	1805-1990	4 AVG	EDGE	28	16/1805,1880	33	2.5	1265A/1 (TO-270-2 Gull)
MRF6S18060NR1 ^(18a)	I/O	1800-2000	60 CW	1-Tone	26	15/1990	50	0.81	1486/1 (TO-270 WB-4)
MRF6S18060NBR1 ^(18a)	I/O	1800-2000	60 CW	1-Tone	26	15/1990	50	0.81	1484/1 (TO-272 WB-4)
MRF6S18100NR1 ^(18a)	I/O	1805-1990	100 CW	1-Tone	28	14.5/1930,1990	49	0.51	1486/1 (TO-270 WB-4)
MRF6S18100NBR1 ^(18a)	I/O	1805-1990	100 CW	1-Tone	28	14.5/1930,1990	49	0.51	1484/1 (TO-272 WB-4)
MRF7S18125AH ^(46a)	I/O	1805-1880	125 CW	1-Tone	28	17/1880	55	—	465/1 (NI-780)
MRF7S18125AHS ^(46a)	I/O	1805-1880	125 CW	1-Tone	28	17/1880	55	—	465A/1 (NI-780S)
MRF7S18125BH ^(46a)	I/O	1930-1990	125 CW	1-Tone	28	16/1990	55	—	465/1 (NI-780)
MRF7S18125BHS ^(46a)	I/O	1930-1990	125 CW	1-Tone	28	16/1990	55	—	465A/1 (NI-780S)
MRF7S18170HR3 ⁽¹⁸ⁱ⁾	I/O	1805-1880	50 AVG	W-CDMA	28	17.5/1880	31	0.27	465B/1 (NI-880)
MRF7S18170HSR3 ⁽¹⁸ⁱ⁾	I/O	1805-1880	50 AVG	W-CDMA	28	17.5/1880	31	0.27	465C/1 (NI-880S)
MRF6P18190HR6 ^(18o)	I/O	1805-1880	44 AVG	W-CDMA	28	15.9/1805,1880	27.5	0.27	375D/1 (NI-1230)

2000 MHz, Class AB (2-CH N-CDMA and W-CDMA)

MRF6S20010NR1 ^(18a)	I	1930-1990	1 AVG	N-CDMA	28	15.5/1990	16	2.5	1265/1 (TO-270-2)
MRF6S20010GNR1 ^(18a)	I	1930-1990	1 AVG	N-CDMA	28	15.5/1990	16	2.5	1265A/1 (TO-270-2 Gull)
MRF5S19060NR1 ^(18a)	I/O	1930-1990	12 AVG	N-CDMA	28	14/1990	23	0.80	1486/1 (TO-270 WB-4)
MRF5S19060NBR1 ^(18a)	I/O	1930-1990	12 AVG	N-CDMA	28	14/1990	23	0.80	1484/1 (TO-272 WB-4)
MRF6S19060NR1 ^(18a)	I/O	1930-1990	12 AVG	N-CDMA	28	16/1990	26	0.84	1486/1 (TO-270 WB-4)
MRF6S19060NBR1 ^(18a)	I/O	1930-1990	12 AVG	N-CDMA	28	16/1990	26	0.84	1484/1 (TO-272 WB-4)
MRF7S19080HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	24 AVG	W-CDMA	28	18/1990	32	0.60	465/1 (NI-780)
MRF7S19080HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	24 AVG	W-CDMA	28	18/1990	32	0.60	465A/1 (NI-780S)
MRF6S19100NR1 ^(18a)	I/O	1930-1990	22 AVG	N-CDMA	28	14.5/1990	25.5	0.61	1486/1 (TO-270 WB-4)
MRF6S19100NBR1 ^(18a)	I/O	1930-1990	22 AVG	N-CDMA	28	14.5/1990	25.5	0.61	1484/1 (TO-272 WB-4)
MRF6S19100HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	22 AVG	N-CDMA	28	16.1/1990	28	0.44	465/1 (NI-780)
MRF6S19100HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	22 AVG	N-CDMA	28	16.1/1990	28	0.44	465A/1 (NI-780S)
MRF7S19100NR1 ^(18a)	I/O	1930-1990	29 AVG	W-CDMA	28	17.5/1990	30	0.57	1486/1 (TO-270 WB-4)
MRF7S19100NBR1 ^(18a)	I/O	1930-1990	29 AVG	W-CDMA	28	17.5/1990	30	0.57	1484/1 (TO-272 WB-4)
MRF6S19120HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	19 AVG	N-CDMA	28	15/1990	21.5	0.43	465/1 (NI-780)
MRF6S19120HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	19 AVG	N-CDMA	28	15/1990	21.5	0.43	465A/1 (NI-780S)
MRF7S19120NR1 ^{(18a)★}	I/O	1930-1990	36 AVG	W-CDMA	28	18/1990	32	0.43	1730 (TO-270 WBL-4)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units;

g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units;

o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

RF LDMOS Power Transistors (continued)

Table 7. PCS and 3G - To 2200 MHz (continued)

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
2000 MHz, Class AB (2-CH N-CDMA and W-CDMA) (continued)									
MRF5S19130HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	26 AVG	N-CDMA	28	13/1990	25	0.40	465C/1 (NI-880S)
MD7P19130HR3 ⁽¹⁸ⁱ⁾ ★	I/O	1930-1990	40 AVG	W-CDMA	28	20/1990	30	0.31	465M/1 (NI-780-4)
MD7P19130HSR3 ⁽¹⁸ⁱ⁾ ★	I/O	1930-1990	40 AVG	W-CDMA	28	20/1990	30	0.31	465H/1 (NI-780S-4)
MRF6S19140HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	29 AVG	N-CDMA	28	16/1990	27.5	0.33	465B/1 (NI-880)
MRF6S19140HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	29 AVG	N-CDMA	28	16/1990	27.5	0.33	465C/1 (NI-880S)
MRF5S19150HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	32 AVG	N-CDMA	28	14/1990	26	0.41	465B/1 (NI-880)
MRF7S19170HR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	50 AVG	W-CDMA	28	17.2/1990	32	0.25	465B/1 (NI-880)
MRF7S19170HSR3 ⁽¹⁸ⁱ⁾	I/O	1930-1990	50 AVG	W-CDMA	28	17.2/1990	32	0.25	465C/1 (NI-880S)
MRF6S19200HR3 ⁽¹⁸ⁱ⁾ ★	I/O	1930-1990	56 AVG	W-CDMA	28	17.9/1990	29.5	0.35	465/1 (NI-780)
MRF6S19200HSR3 ⁽¹⁸ⁱ⁾ ★	I/O	1930-1990	56 AVG	W-CDMA	28	17.9/1990	29.5	0.35	465A/1 (NI-780S)
2000 MHz, Class AB (2-CH W-CDMA, UMTS)									
MRF6S20010NR1 ^(18a)	I	2110-2170	1 AVG	W-CDMA	28	15.5/2170	15	2.5	1265/1 (TO-270-2)
MRF6S20010GNR1 ^(18a)	I	2110-2170	1 AVG	W-CDMA	28	15.5/2170	15	2.5	1265A/1 (TO-270-2 Gull)
MRF5P21045NR1 ^(18a)	I/O	2110-2170	10 AVG	W-CDMA	28	14.5/2170	25.5	1.35	1486/1 (TO-270 WB-4)
MRF5S21045NR1 ^(18a)	I/O	2110-2170	10 AVG	W-CDMA	28	14.5/2170	25.5	1.35	1486/1 (TO-270 WB-4)
MRF5S21045NBR1 ^(18a)	I/O	2110-2170	10 AVG	W-CDMA	28	14.5/2170	25.5	1.35	1484/1 (TO-272 WB-4)
MRF6S21050LR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	11.5 AVG	W-CDMA	28	16/2170	27.7	1.16	465E/1 (NI-400)
MRF6S21050LSR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	11.5 AVG	W-CDMA	28	16/2170	27.7	1.16	465F/1 (NI-400S)
MRF6S21060NR1 ^(18a)	I/O	2110-2170	14 AVG	W-CDMA	28	15.5/2170	26	0.89	1486/1 (TO-270 WB-4)
MRF6S21060NBR1 ^(18a)	I/O	2110-2170	14 AVG	W-CDMA	28	15.5/2170	26	0.89	1484/1 (TO-272 WB-4)
MRF7S21080HR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	22 AVG	W-CDMA	28	18/2170	32	0.60	465/1 (NI-780)
MRF7S21080HSR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	22 AVG	W-CDMA	28	18/2170	32	0.60	465A/1 (NI-780S)
MRF6S21100HR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	23 AVG	W-CDMA	28	15.9/2170	27.6	0.45	465/1 (NI-780)
MRF6S21100HSR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	23 AVG	W-CDMA	28	15.9/2170	27.6	0.45	465A/1 (NI-780S)
MRF6S21100NR1 ^(18a)	I/O	2110-2170	23 AVG	W-CDMA	28	14.5/2170	25.5	0.57	1486/1 (TO-270 WB-4)
MRF6S21100NBR1 ^(18a)	I/O	2110-2170	23 AVG	W-CDMA	28	14.5/2170	25.5	0.57	1484/1 (TO-272 WB-4)
MRF7S21110HR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	33 AVG	W-CDMA	28	17.3/2170	32.5	0.37	465/1 (NI-780)
MRF7S21110HSR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	33 AVG	W-CDMA	28	17.3/2170	32.5	0.37	465A/1 (NI-780S)
MRF6S21140HR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	30 AVG	W-CDMA	28	15.5/2170	27.5	0.35	465B/1 (NI-880)
MRF6S21140HSR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	30 AVG	W-CDMA	28	15.5/2170	27.5	0.35	465C/1 (NI-880S)
MRF7S21150HR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	44 AVG	W-CDMA	28	17.5/2170	31	0.33	465/1 (NI-780)
MRF7S21150HSR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	44 AVG	W-CDMA	28	17.5/2170	31	0.33	465A/1 (NI-780S)
MRF7S21170HR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	50 AVG	W-CDMA	28	16/2170	31	0.31	465B/1 (NI-880)
MRF7S21170HSR3 ⁽¹⁸ⁱ⁾	I/O	2110-2170	50 AVG	W-CDMA	28	16/2170	31	0.31	465C/1 (NI-880S)
MRF5P21180HR6 ^(18o)	I/O	2110-2170	38 AVG	W-CDMA	28	14/2170	25.5	0.31	375D/1 (NI-1230)
MRF6P21190HR6 ^(18a)	I/O	2110-2170	44 AVG	W-CDMA	28	15.5/2170	26.5	0.25	375D/1 (NI-1230)
MRF6S21190HR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	54 AVG	W-CDMA	28	16/2170	29	0.29	465B/1 (NI-880)
MRF6S21190HSR3 ⁽¹⁸ⁱ⁾ ★	I/O	2110-2170	54 AVG	W-CDMA	28	16/2170	29	0.29	465C/1 (NI-880S)
MRF7S21210H ^(46a)	I/O	2110-2170	63 AVG	W-CDMA	28	18.5/2170	29	—	465/1 (NI-780)
MRF7S21210HS ^(46a)	I/O	2110-2170	63 AVG	W-CDMA	28	18.5/2170	29	—	465A/1 (NI-780S)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

RF GaAs Power Transistors

Freescale Semiconductor GaAs power transistors are made using an InGaAs PHEMT or HFET epitaxial structure for superior RF efficiency and linearity. The FETs listed in this section are designed for operation in base station infrastructure RF power amplifiers and are grouped according to frequency range and type of application.

Table 1. Linear Transistors - To 6000 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ)/Freq Watts/MHz	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ)/Freq. %/MHz	θ _{JC} °C/W	Pkg/Style	
To 6000 MHz, Class AB (WLL, BWA, W-CDMA)									
MRFG35002N6AT1 ^(18f) ★	U	DC-6000	0.16 AVG/3550	W-CDMA ⁽⁴⁴⁾	6	10/3550	26.5/3550	13.7	466/1 (PLD 1.5)
MRFG35003ANT1 ^(18f)	U	DC-6000	0.3 AVG/3550	W-CDMA ⁽⁴⁴⁾	12	10.8/3550	24.5/3550	15.9	466/1 (PLD 1.5)
MRFG35003N6AT1 ^(18f)	U	DC-6000	0.45 AVG/3550	W-CDMA ⁽⁴⁴⁾	6	10/3550	27/3550	5.9	466/1 (PLD 1.5)
MRFG35005ANT1 ^(18f)	U	DC-6000	0.45 AVG/3550	W-CDMA ⁽⁴⁴⁾	12	11/3550	26/3550	13.7	466/1 (PLD 1.5)
MRFG35010ANT1 ^(18f)	U	DC-6000	1 AVG/3550	W-CDMA ⁽⁴⁴⁾	12	10/3550	25/3550	6.5	466/1 (PLD 1.5)
MRFG35010AR1 ^(18a)	U	DC-6000	1 AVG/3550	W-CDMA ⁽⁴⁴⁾	12	10/3550	25/3550	4.0 ⁽¹⁶⁾	360D/1 (NI-360HF)
MRFG35020AR1 ^(18a) ★	I	2300-3800	2 AVG/3550	W-CDMA ⁽⁴⁴⁾	12	11.5/3550	22/3550	2.7	360E/2 (NI-360 Short Lead)

⁽¹⁶⁾Class A = 4.1

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁴⁾Peak-to-Average Power Ratio = 8.5 dB

★New Product

RF WiMAX, WiBro, BWA Power Transistors

With the coming deployment of WiMAX systems, device performance demands rise to a new level, requiring exceptional linearity and efficiency. WiMAX uses 64-state quadrature amplitude modulation (64 QAM) and orthogonal frequency-division multiplexing (OFDM), a combination that requires RF performance, especially in error vector magnitude (EVM), greater than even the latest deployed cellular access methods. To meet these requirements, Freescale has developed a full roadmap of RF power devices. Current products support the 1.6, 2.3, 2.5 and 3.5 GHz bands. Additionally, Freescale is the only supplier that offers both silicon and compound semiconductor WiMAX solutions.

Table 1. RF WiMAX, WiBro, BWA - To 6000 MHz

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style
1600-1700 MHz, Class AB								
MRF7S16150HR3 ⁽¹⁸ⁱ⁾	I/O	1600-1660	32 AVG	WiMAX	28	19.7/1660	25.4	465/1 (NI-780)
MRF7S16150HSR3 ⁽¹⁸ⁱ⁾	I/O	1600-1660	32 AVG	WiMAX	28	19.7/1660	25.4	465A/1 (NI-780S)
2300-2400 MHz, Class AB								
MRF6S27015NR1 ^(18a)	I	2300-2700	3 AVG	W-CDMA	28	14/2600	22	1265/1 (TO-270-2)
MRF6S27015GNR1 ^(18a)	I	2300-2700	3 AVG	W-CDMA	28	14/2600	22	1265A/1 (TO-270-2 Gull)
MRF6S23100HR3 ⁽¹⁸ⁱ⁾	I/O	2300-2400	20 AVG	W-CDMA	28	15.4/2300, 2400	23.5	465/1 (NI-780)
MRF6S23100HSR3 ⁽¹⁸ⁱ⁾	I/O	2300-2400	20 AVG	W-CDMA	28	15.4/2300, 2400	23.5	465A/1 (NI-780S)
MRF6S23140HR3 ⁽¹⁸ⁱ⁾	I/O	2300-2400	28 AVG	W-CDMA	28	15.2/2300, 2400	25	465B/1 (NI-880)
MRF6S23140HSR3 ⁽¹⁸ⁱ⁾	I/O	2300-2400	28 AVG	W-CDMA	28	15.2/2300, 2400	25	465C/1 (NI-880S)
MRF6P23190HR6 ^(18o)	I/O	2300-2400	40 AVG	W-CDMA	28	14/2300, 2400	23.5	375D/1 (NI-1230)
2600-2700 MHz, Class AB								
MRF6S27015NR1 ^(18a)	I	2300-2700	3 AVG	W-CDMA	28	14/2600	22	1265/1 (TO-270-2)
MRF6S27015GNR1 ^(18a)	I	2300-2700	3 AVG	W-CDMA	28	14/2600	22	1265A/1 (TO-270-2 Gull)
MW7IC2725NR1 ^{(18a)★}	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	1886/- (TO-270 WB-16)
MW7IC2725GNR1 ^{(18a)★}	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	1887/- (TO-270 WB-16 Gull)
MW7IC2725NB ^(46b)	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	1329/- (TO-272 WB-16)
MRF6S27050HR3 ⁽¹⁸ⁱ⁾	I/O	2500-2700	7 AVG	W-CDMA	28	16/2500, 2700	22.5	465/1 (NI-780)
MRF6S27050HSR3 ⁽¹⁸ⁱ⁾	I/O	2500-2700	7 AVG	W-CDMA	28	16/2500, 2700	22.5	465A/1 (NI-780S)
MW7IC2750NR1 ^{(18a)★}	I/O	2700	8 AVG	WiMAX	28	26/2700	17	1618/- (TO-270 WB-14)
MW7IC2750GNR1 ^{(18a)★}	I/O	2700	8 AVG	WiMAX	28	26/2700	17	1621/- (TO-270 WB-14 Gull)
MW7IC2750NBR1 ^{(18a)★}	I/O	2700	8 AVG	WiMAX	28	26/2700	17	1617/- (TO-272 WB-14)
MRF6S27085HR3 ⁽¹⁸ⁱ⁾	I/O	2600-2700	20 AVG	N-CDMA	28	15.5/2655	23.5	465/1 (NI-780)
MRF6S27085HSR3 ⁽¹⁸ⁱ⁾	I/O	2600-2700	20 AVG	N-CDMA	28	15.5/2655	23.5	465A/1 (NI-780S)
MRF7S27130HR3 ⁽¹⁸ⁱ⁾	I/O	2500-2700	23 AVG	WiMAX	28	16.5/2500, 2700	20	465/1 (NI-780)
MRF7S27130HSR3 ⁽¹⁸ⁱ⁾	I/O	2500-2700	23 AVG	WiMAX	28	16.5/2500, 2700	20	465A/1 (NI-780S)
MRF6P27160HR6 ^(18o)	I/O	2600-2700	35 AVG	N-CDMA	28	14.6/2655	22.6	375D/1 (NI-1230)
3400-3800 MHz, Class AB								
MRF7S38010HR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	2 AVG	WiMAX	30	15/3400, 3600	17	465/1 (NI-400-240)
MRF7S38010HSR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	2 AVG	WiMAX	30	15/3400, 3600	17	465J/1 (NI-400S-240)
MW7IC3825N ^(46b)	I/O	3400-3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	1886/- (TO-270 WB-16)
MW7IC3825GN ^(46b)	I/O	3400-3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	1887/- (TO-270 WB-16 Gull)
MW7IC3825NB ^(46b)	I/O	3400-3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	1329/- (TO-272 WB-16)
MRF7S38040HR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	8 AVG	WiMAX	30	14/3400, 3600	15.6	465/1 (NI-400-240)
MRF7S38040HSR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	8 AVG	WiMAX	30	14/3400, 3600	15.6	465J/1 (NI-400S-240)
MRF7S38075HR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	12 AVG	WiMAX	30	14/3400, 3600	14	465/1 (NI-780)
MRF7S38075HSR3 ⁽¹⁸ⁱ⁾	I/O	3400-3800	12 AVG	WiMAX	30	14/3400, 3600	14	465A/1 (NI-780S)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

RF WiMAX, WiBro, BWA Power Transistors (continued)

Table 1. RF WiMAX, WiBro, BWA - To 6000 MHz (continued)

Product		Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style
DC-5800 MHz, Class AB									
MRFG35002N6AT1 ^(18f) ★	U	DC-6000	0.16 AVG	W-CDMA ⁽⁴⁴⁾	6	10/3550	26.5	13.7	466/1 (PLD 1.5)
MRFG35003ANT1 ^(18f)	U	DC-6000	0.3 AVG	W-CDMA ⁽⁴⁴⁾	12	10.8/3550	24.5	15.9	466/1 (PLD 1.5)
MRFG35003N6AT1 ^(18f)	U	DC-6000	0.45 AVG	W-CDMA ⁽⁴⁴⁾	6	10/3550	27	5.9	466/1 (PLD 1.5)
MRFG35005ANT1 ^(18f)	U	DC-6000	0.45 AVG	W-CDMA ⁽⁴⁴⁾	12	11/3550	26	13.7	466/1 (PLD 1.5)
MRFG35010ANT1 ^(18f)	U	DC-6000	1 AVG	W-CDMA ⁽⁴⁴⁾	12	10/3550	25	6.5	466/1 (PLD 1.5)
MRFG35010AR1 ^(18a)	U	DC-6000	1 AVG	W-CDMA ⁽⁴⁴⁾	12	10/3550	25	4.0 ⁽¹⁶⁾	360D/1 (NI-360HF)
MRFG35020AR1 ^(18a) ★	I	2300-3800	2 AVG	W-CDMA ⁽⁴⁴⁾	12	11.5/3550	22	2.7	360E/2 (NI-360 Short Lead)

⁽¹⁶⁾Class A = 4.1

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units;

g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units;

o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁴⁾Peak-to-Average Power Ratio = 8.5 dB

★New Product

Wideband RF Power Transistors

Table 1. Wideband RF Power

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
135–520 MHz									
MRF1513NT1 ^(18f)	U	400–520	3 CW	1–Tone	7.5/12.5	11/520	55	4.0	466/1 (PLD 1.5)
MRF1511NT1 ^(18f)	U	135–175	8 CW	1–Tone	7.5	11.5/175	55	2.0	466/1 (PLD 1.5)
MRF1518NT1 ^(18f)	U	400–520	8 CW	1–Tone	12.5	11/520	55	2.0	466/1 (PLD 1.5)
MRF1535NT1 ^(18j)	U	400–520	35 CW	1–Tone	12.5	10/520	50	0.90	1264/1 (TO–272–6 Wrap)
MRF1550NT1 ^(18j)	U	135–175	50 CW	1–Tone	12.5	10/175	50	0.75	1264/1 (TO–272–6 Wrap)
MRF1570NT1 ^(18j)	U	400–470	70 CW	1–Tone	12.5	10/470	50	0.75	1366/1 (TO–272–8 Wrap)
450–3000 MHz									
MW6S004NT1 ^(18f)	U	1–2000	4 PEP	2–Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW6S010NR1 ^(18a)	U	450–1500	10 PEP	2–Tone	28	18/960	32	2.85	1265/1 (TO–270–2)
MHVIC915NR2 ^(18e)	I/O	700–1000	15 CW	1–Tone	26	30/880	56	5.0	978/- (PFP–16)
MW4IC915NBR1 ^(18a)	I/O	700–1000	15 CW	1–Tone	26	30/960	44	1.7	1329/- (TO–272 WB–16)
MRFE6S9045NR1 ^{(18a)★}	U	450–1000	45 PEP	2–Tone	28	22/880	60	1.1	1265/1 (TO–270–2)
MRFE6S9060NR1 ^{(18a)★}	U	450–1100	60 PEP	2–Tone	28	21/880	55	0.77	1265/1 (TO–270–2)
MRF5S9070NR1 ^(18a)	U	450–1200	70 CW	1–Tone	26	16/945	62	0.80	1265/1 (TO–270–2)
MRFE6P3300HR3 ^{(18i)★}	I/O	450–860	270 PEP	2–Tone	32	20.4/860	44.8	0.23	375G/1 (NI–860C3)
MRF6VP3450H ^(46a)	I	470–860	450 PEP	2–Tone	50	23/860	—	—	375D/1 (NI–1230)
1000–3800 MHz									
MMG3005NT1 ^(18f)	I/O	800–2200	1 W CW	1–Tone	5	15/900	—	21.5	1543/1 (PQFN 5x5)
MMG3006NT1 ^{(18f)★}	I/O	400–2200	2 W CW	1–Tone	5	13/900	—	—	1898/1 (QFN 4x4)
MRF6S20010NR1 ^(18a)	I	1600–2200	10 CW	1–Tone	28	15.5/2170	45	5.9	1265/1 (TO–270–2)
MHV5IC2215NR2 ^(18e)	I/O	1250–2500	10 CW	1–Tone	28	24/2140	45	3.5	978/- (PFP–16)
MRF6S27015NR1 ^(18a)	I	2000–2700	15 CW	W–CDMA	28	15.4/2300, 2400	45	2.0	1265/1 (TO–270–2)
MW5IC2030NBR1 ^(18a)	I/O	1700–2300	30 CW	1–Tone	28	23/1960	45	1.75	1329/- (TO–272 WB–16)
MW6IC2240NBR1 ^(18a)	I/O	2050–2230	40 CW	1–Tone	28	28/2140	45	0.87	1329/- (TO–272 WB–16)
MW7IC2725NR1 ^{(18a)★}	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	1.4	1886/- (TO–270 WB–16)
MW7IC2725GNR1 ^{(18a)★}	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	1.4	1887/- (TO–270 WB–16 Gull)
MW7IC2725NB ^(46b)	I/O	2700	4 AVG	WiMAX	28	27.5/2700	17	—	1329/- (TO–272 WB–16)
MRF6S27050HR3 ⁽¹⁸ⁱ⁾	I/O	2000–2700	50 CW	W–CDMA	28	16/2300, 2400	45	0.85	465/1 (NI–780)
MW7IC2750NR1 ^{(18a)★}	I/O	2300–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1618/- (TO–270 WB–14)
MW7IC2750GNR1 ^{(18a)★}	I/O	2300–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1621/- (TO–270 WB–14 Gull)
MW7IC2750NBR1 ^{(18a)★}	I/O	2300–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1617/- (TO–272 WB–14)
MRF6S27085HR3 ⁽¹⁸ⁱ⁾	I/O	2600–2700	85 CW	1–Tone	28	15.5/2630, 2660	48	0.50	465/1 (NI–780)
MRF6S23100HR3 ⁽¹⁸ⁱ⁾	I/O	2200–2500	100 CW	1–Tone	28	15.4/2300, 2400	50	0.53	465/1 (NI–780)
MRF6P27160HR6 ^(18o)	I/O	2600–2700	160 CW	1–Tone	28	14.6/2630, 2660	48	0.29	375D/1 (NI–1230)
MW7IC3825N ^(46b)	I/O	3400–3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	—	1886/- (TO–270 WB–16)
MW7IC3825GN ^(46b)	I/O	3400–3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	—	1887/- (TO–270 WB–16 Gull)
MW7IC3825NB ^(46b)	I/O	3400–3800	5 AVG	WiMAX	28	23.5/3400, 3600	15	—	1329/- (TO–272 WB–16)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

Wideband RF Power Transistors (continued)

Table 1. Wideband RF Power (continued)

Product	Frequency Band ⁽³⁷⁾ MHz	P _{out} (Typ) Watts	Test Signal	V _{DD} Volts	Gain (Typ)/Freq. dB/MHz	η Eff. (Typ) %	θ _{JC} °C/W	Pkg/Style	
DC-5800 MHz									
MRFG35002N6AT1 ^(18f) ★	U	DC-6000	2 CW	W-CDMA ⁽⁴⁴⁾	6	10/3550	26.5	13.7	466/1 (PLD 1.5)
MRFG35003ANT1 ^(18f)	U	DC-6000	3 CW	W-CDMA ⁽⁴⁴⁾	12	10.8/3550	24.5	15.9	466/1 (PLD 1.5)
MRFG35003N6AT1 ^(18f)	U	DC-6000	3 CW	W-CDMA ⁽⁴⁴⁾	6	10/3550	27	5.9	466/1 (PLD 1.5)
MRFG35005ANT1 ^(18f)	U	DC-6000	5 CW	W-CDMA ⁽⁴⁴⁾	12	11/3550	26	13.7	466/1 (PLD 1.5)
MRFG35010ANT1 ^(18f)	U	DC-6000	10 CW	W-CDMA ⁽⁴⁴⁾	12	10/3550	25	6.5	466/1 (PLD 1.5)
MRFG35010AR1 ^(18a)	U	DC-6000	10 CW	W-CDMA ⁽⁴⁴⁾	12	10/3550	25	4.0 ⁽¹⁶⁾	360D/1 (NI-360HF)
MRFG35020AR1 ^(18a) ★	I	2300-3800	20 CW	W-CDMA ⁽⁴⁴⁾	12	11.5/3550	22	2.7	360E/2 (NI-360 Short Lead)

⁽¹⁶⁾Class A = 4.1

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units;

g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units;

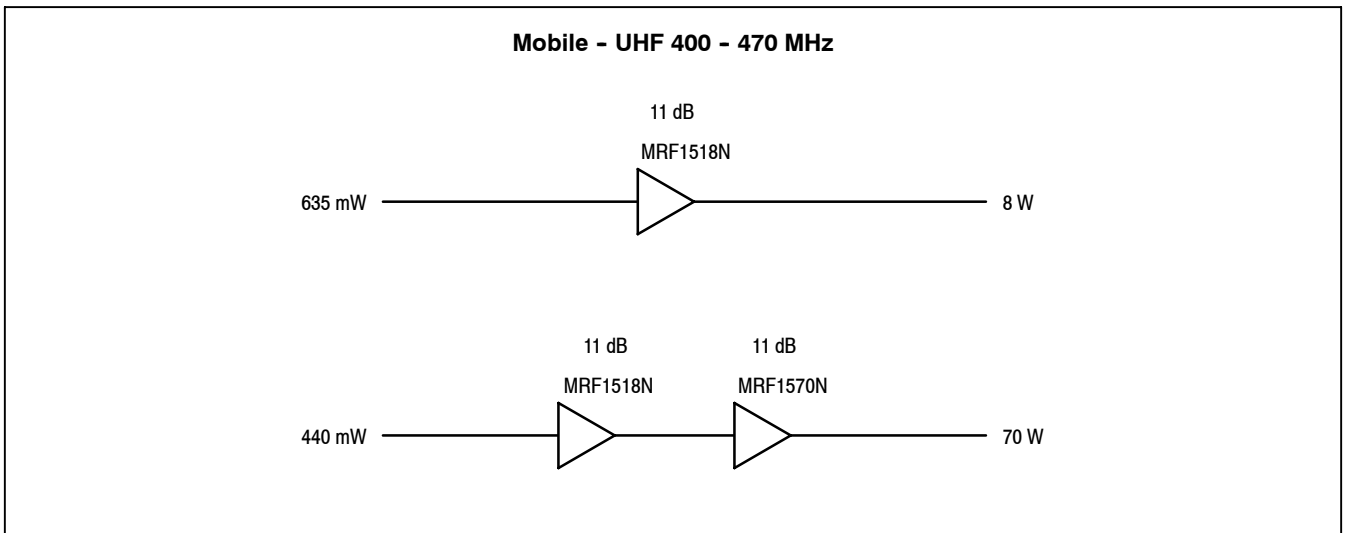
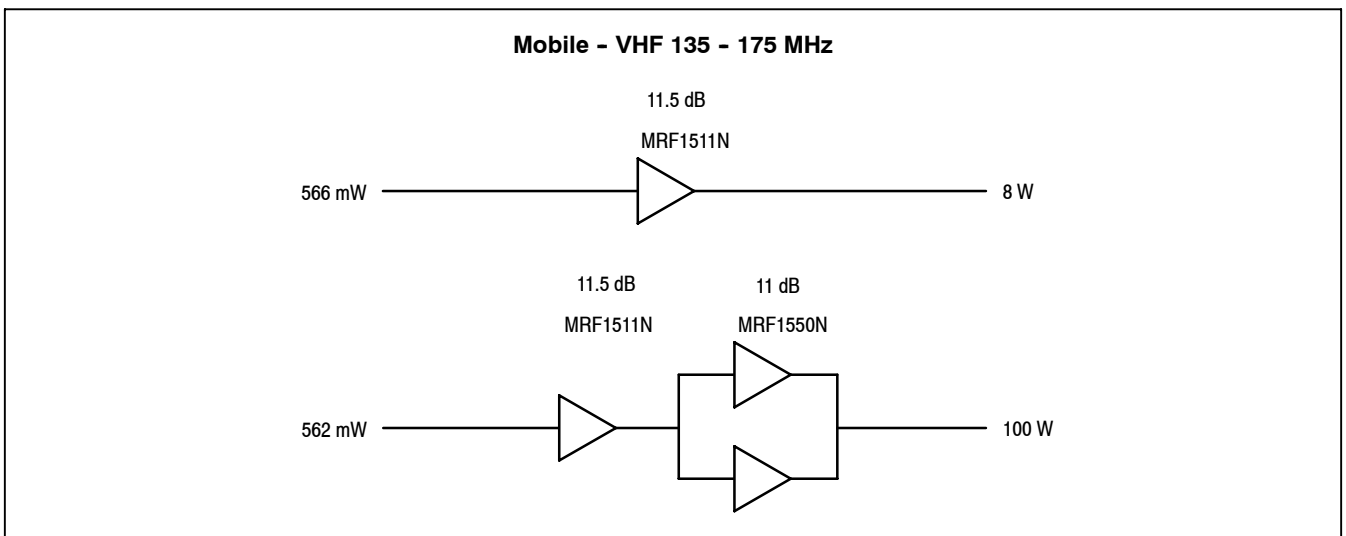
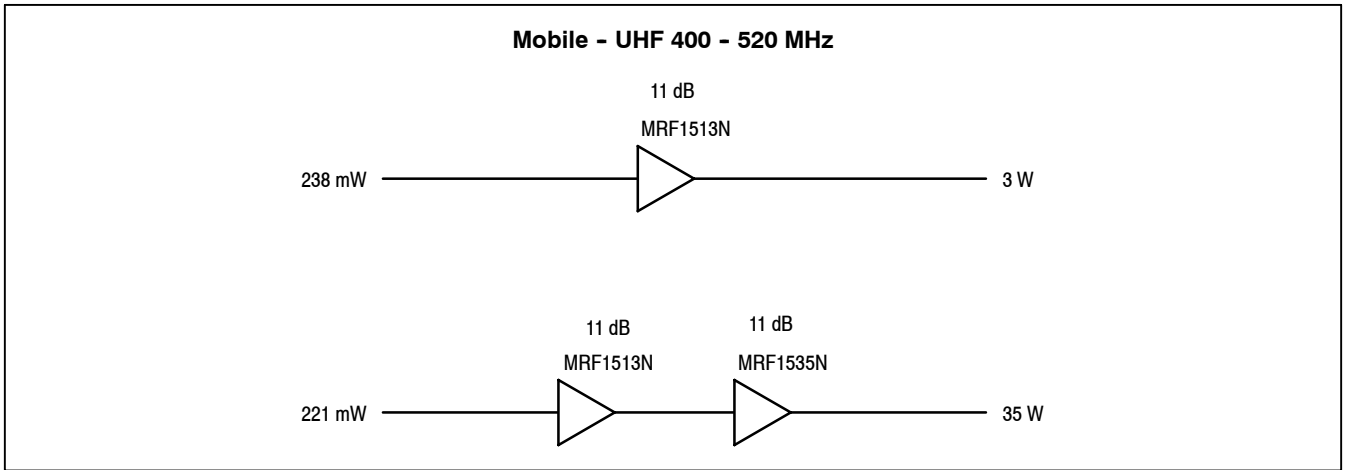
o) R6 = 150 units; p) R5 = 50 units.

⁽³⁷⁾U = Unmatched; I = Input; I/O = Input/Output.

⁽⁴⁴⁾Peak-to-Average Power Ratio = 8.5 dB

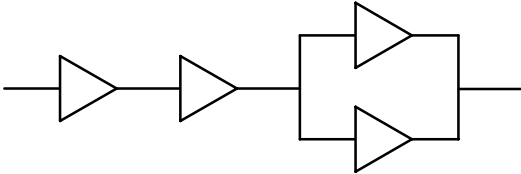
★New Product

RF High Power Amplifier Line-ups



RF High Power Amplifier Line-ups (continued)

CDMA - 450 MHz

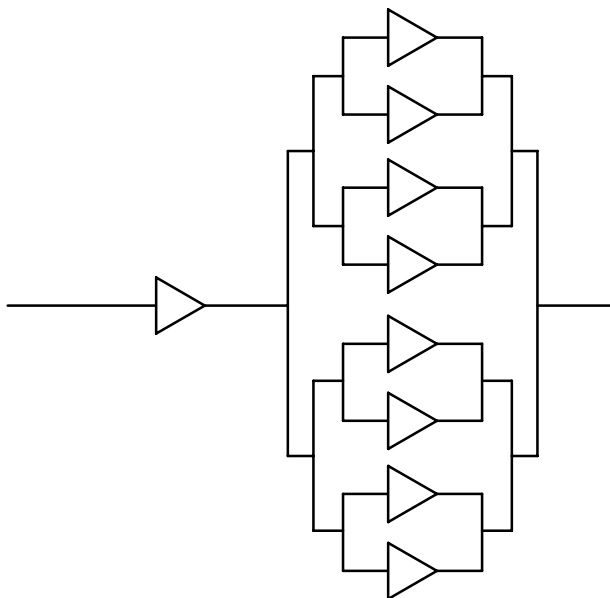


Air Cavity	MRFE6P3300H
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Over-Molded Plastic	MW6S004N	MRFE6S9060N	MRFE5S4125N
	MW6S010N	MRFE5S9070N	

RF High Power Amplifier Line-ups (continued)

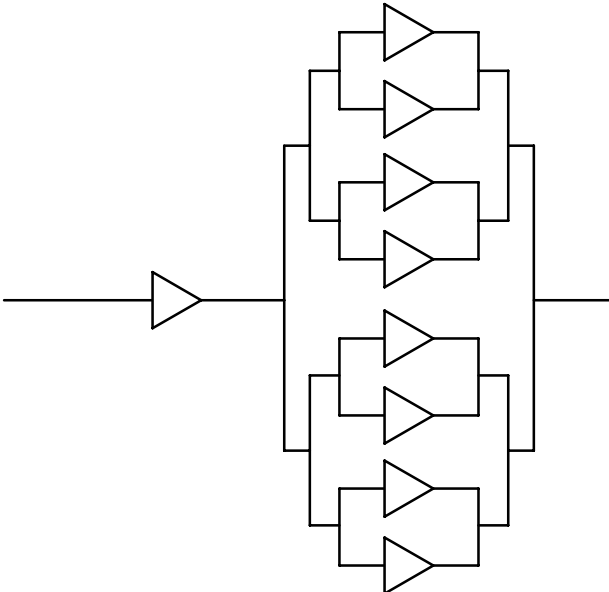
Broadcast 175 - 225 MHz - DVBT OFDM



Air Cavity		MRF6VP2600H MRF6VP21KH
Over-Molded Plastic	MW6S004N MW6S010N MRF6V2010N	MRF6V2150N MRF6V2300N

RF High Power Amplifier Line-ups (continued)

Broadcast 470 - 860 MHz - DVBT OFDM

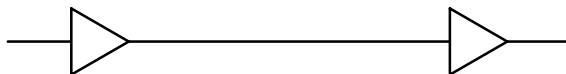


Air Cavity	MRF377H MRFE6P3300H MRF6VP3450H
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Over-Molded Plastic	MW6S004N MW6S010N MRFE6S9045N MRFE6S9060N
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RF High Power Amplifier Line-ups (continued)

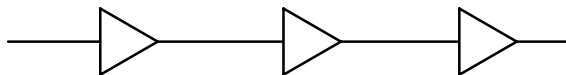
N-CDMA, GSM and EDGE - 900 MHz



Air Cavity	MRF6S9130H
	MRF5S9150H
	MRF6S9160H
	MRF6S9200H
	MRF6P9220H

Over-Molded Plastic	MRF9002N	MRF6S9045N
	MHVIC910H	MRF6S9060N
	MW6S004N	MW5IC970N
	MW6S010N	MRF5S9070N
	MHVIC915N	MRF5S9080N
	MW4IC915NB/GNB	MRF5S9100N
	MWIC930N/GN	MRF5S9101N
		MWE6IC9100N
	MRF6S9125N	

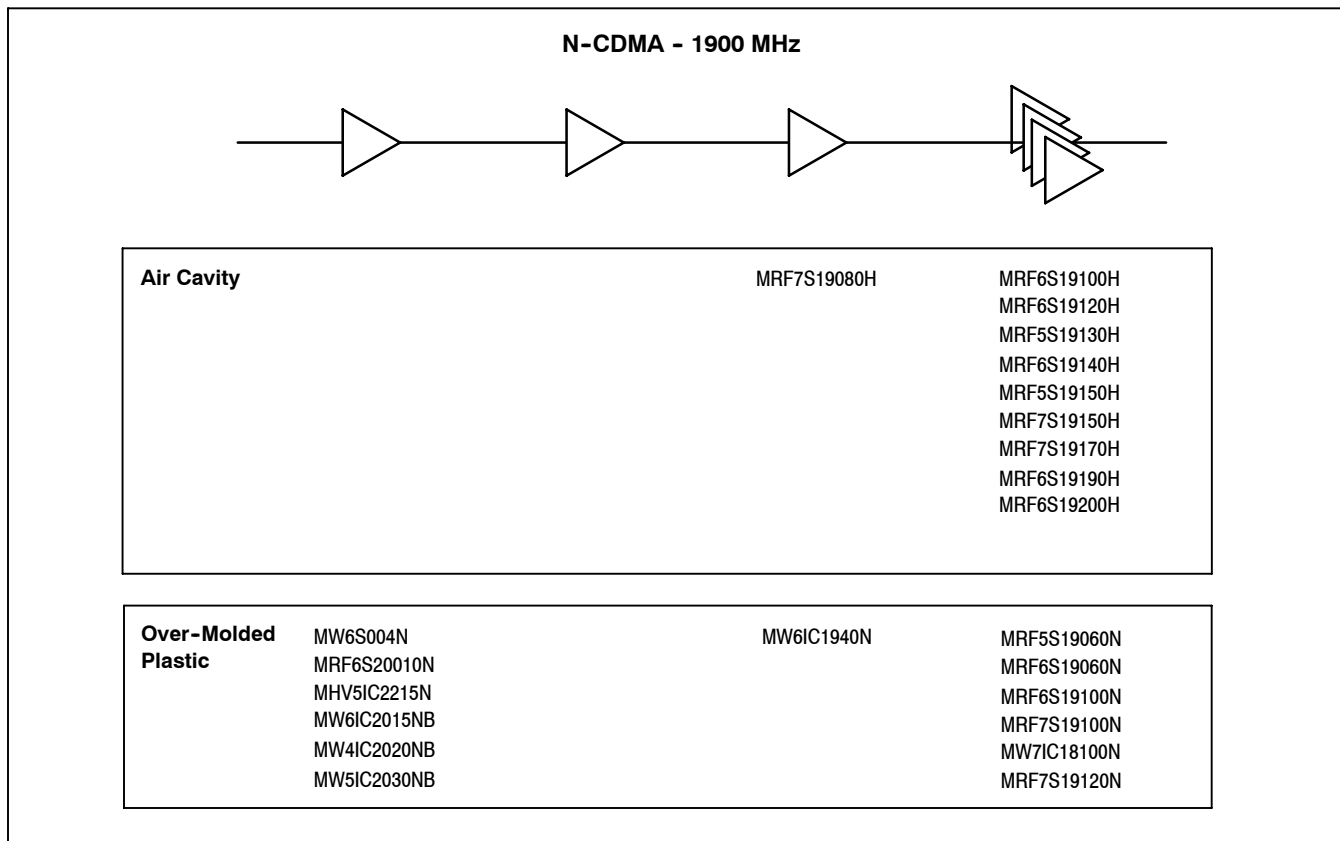
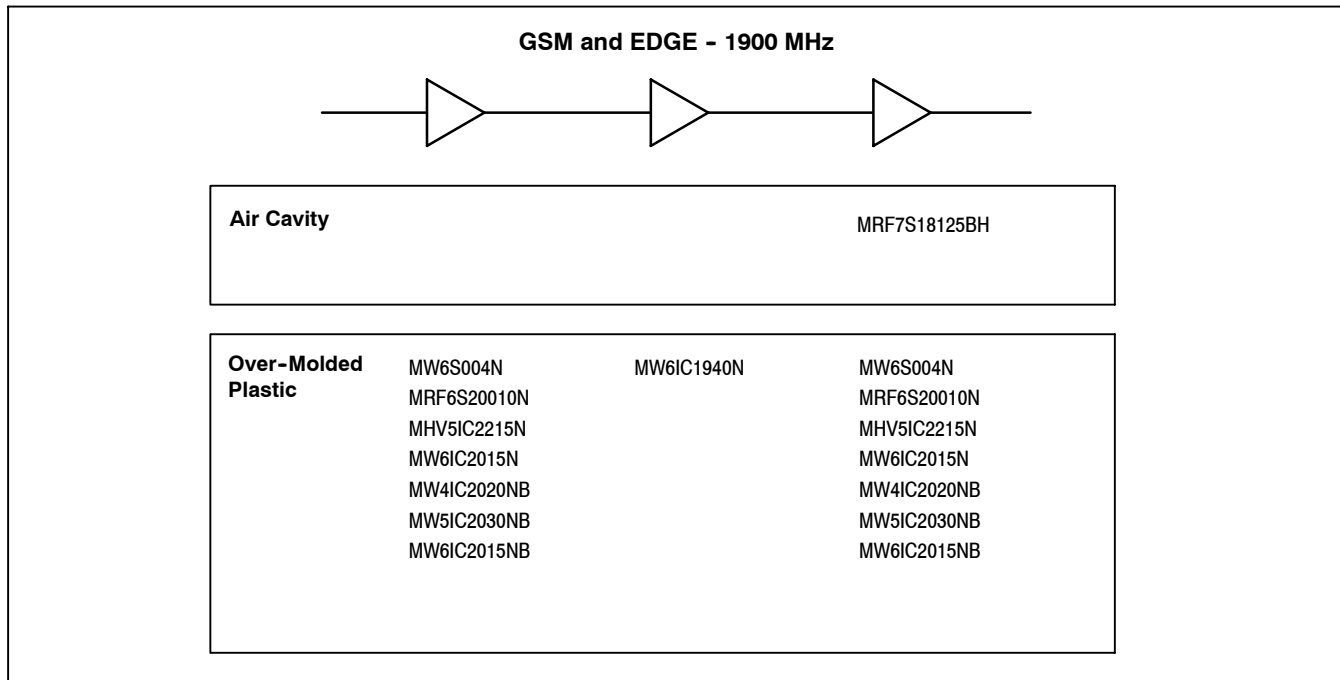
GSM and EDGE - 1800 MHz



Air Cavity	MRF7S18125AH
	MRF7S18170H
	MRF6P18190H

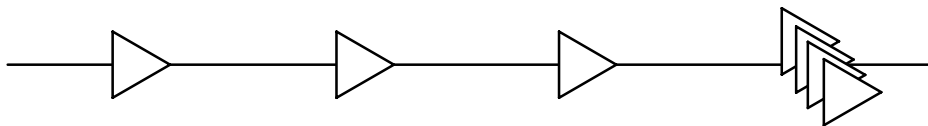
Over-Molded Plastic	MW6S004N	MRF6S18060N
	MHV5IC1810N	MRF6S18100N
	MRF6S20010N	MW7IC18100N
	MHVIC2114N	
	MW6IC2015N	
	MW4IC2020NB	
	MW5IC2030NB	
	MW6IC2015NB	

RF High Power Amplifier Line-ups (continued)



RF High Power Amplifier Line-ups (continued)

W-CDMA - 2200 MHz



Air Cavity

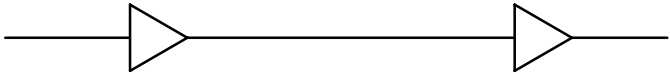
MRF6S21050L	MRF6S21140H
MRF7S21080H	MRF7S21150H
MRF5S21090H	MRF7S21170H
MRF6S21100H	MRF6P21190H
MRF7S21100H	MRF7S21210H

Over-Molded Plastic

MRF6S20010N	MW7IC2220N	MRF6S21060N
MHV5IC2215N	MW6IC2240N	MRF6S21100N
MW4IC2230NB	MRF5S21045N	MRF7S21100N
		MRF7S21120N

RF High Power Amplifier Line-ups (continued)

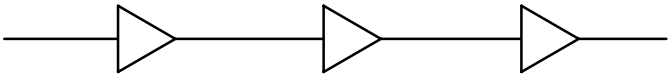
WiMAX - 1600-1700 MHz



Air Cavity	MRF7S16150H
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Over-Molded Plastic	MW6S004N	MRF6S20010N	
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WiBro - 2300-2400 MHz

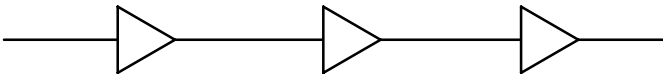


Air Cavity	MRFG35010A MRF35020A	MRF6S23100H MRF6S23140H MRF6P23190H
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Over-Molded Plastic	MMG3014N	MRF6S20010N	
	MRFG35002N6A	MRF6S27015N	
	MRFG35003N6A	MW6IC2420N	
	MRFG35003AN	MW7IC2725N	
	MW6S004N	MW7IC2750N	
	MRFG35005AN		
	MRF35010AN		

RF High Power Amplifier Line-ups (continued)

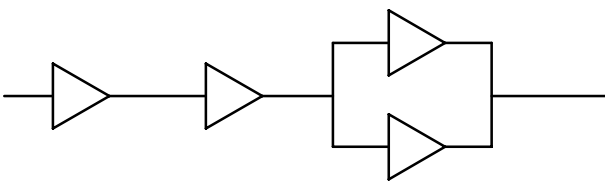
MMDS - 2500-2700 MHz



Air Cavity	MRF35010A	MRF6S27050H	MRF7S27130H
	MRF35020A	MRF6S27085H	MRF6P27160H

Over-Molded Plastic	MMG3014N	MRF6S27015N
	MRF35002N6A	MW7IC2725N
	MRF35003N6A	MW7IC2750N
	MRF35003AN	
	MRF35005AN	
	MRF35010AN	

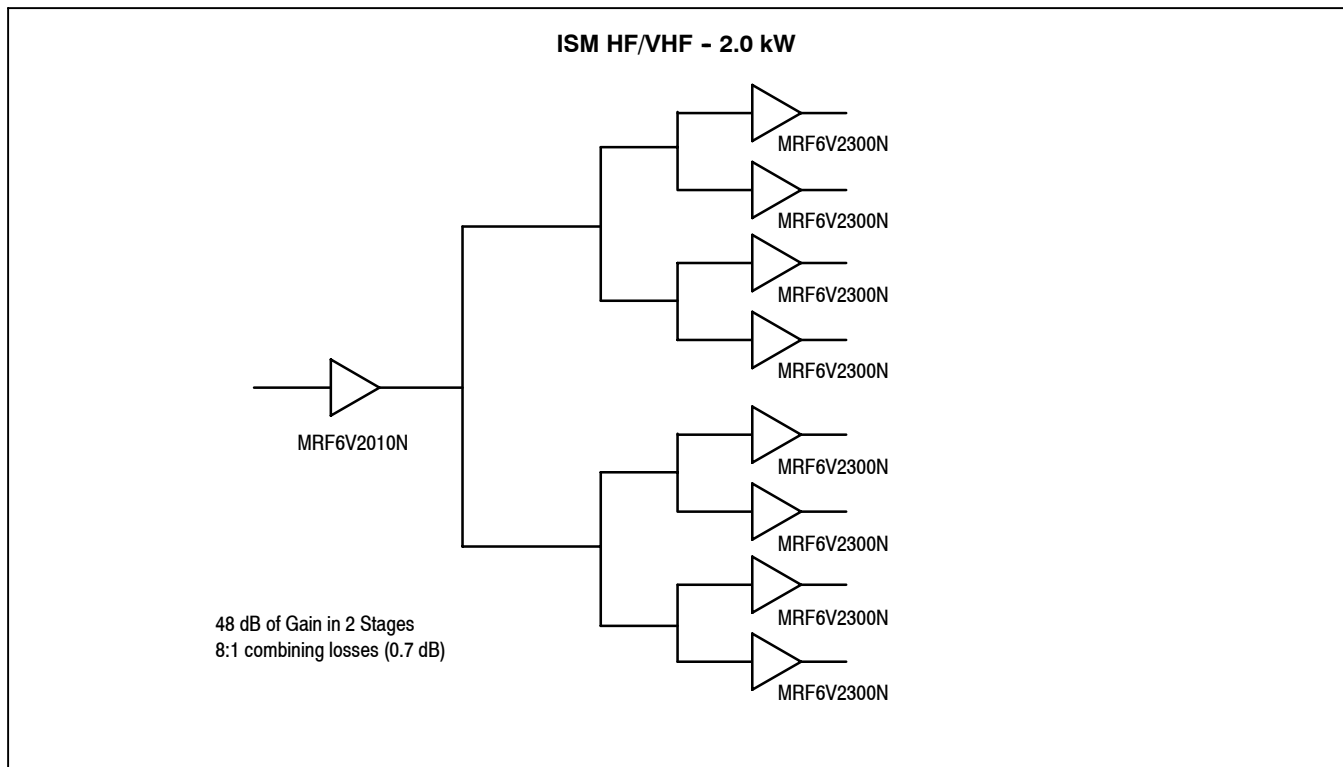
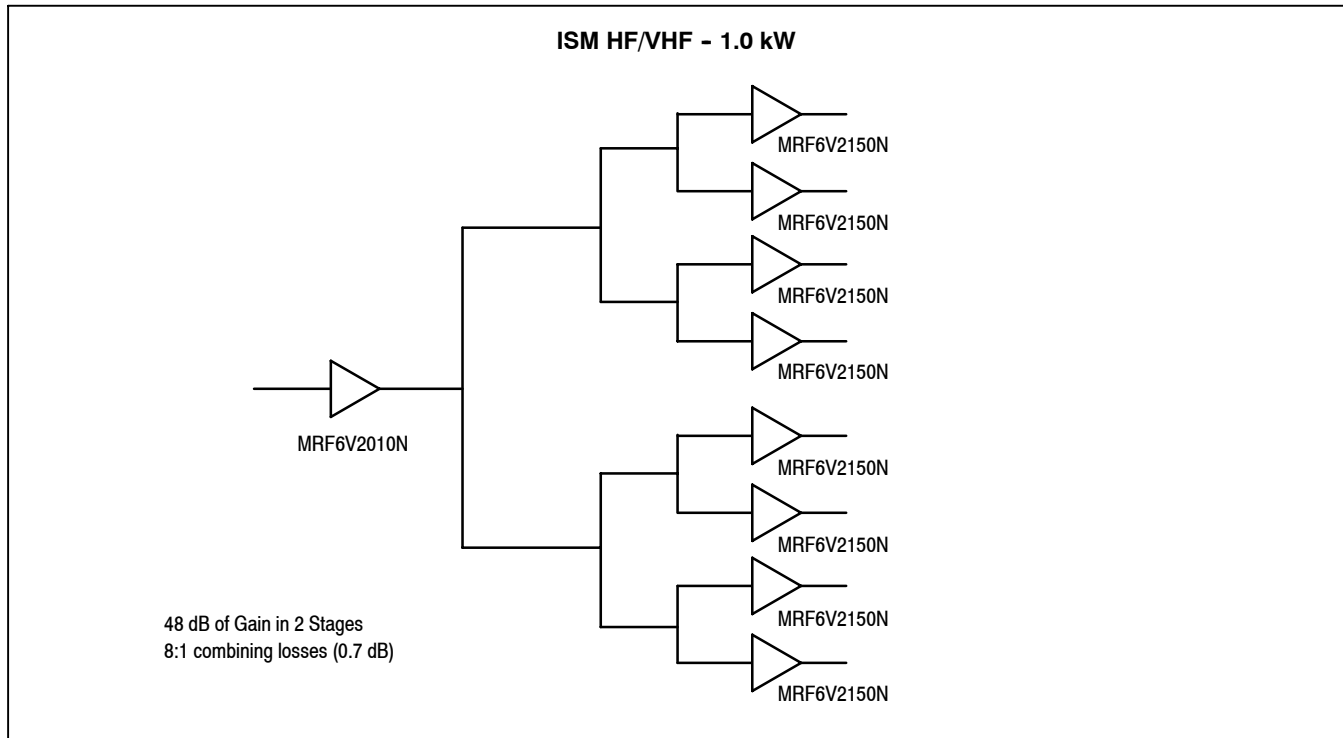
WiMAX - 3400 - 3800 MHz



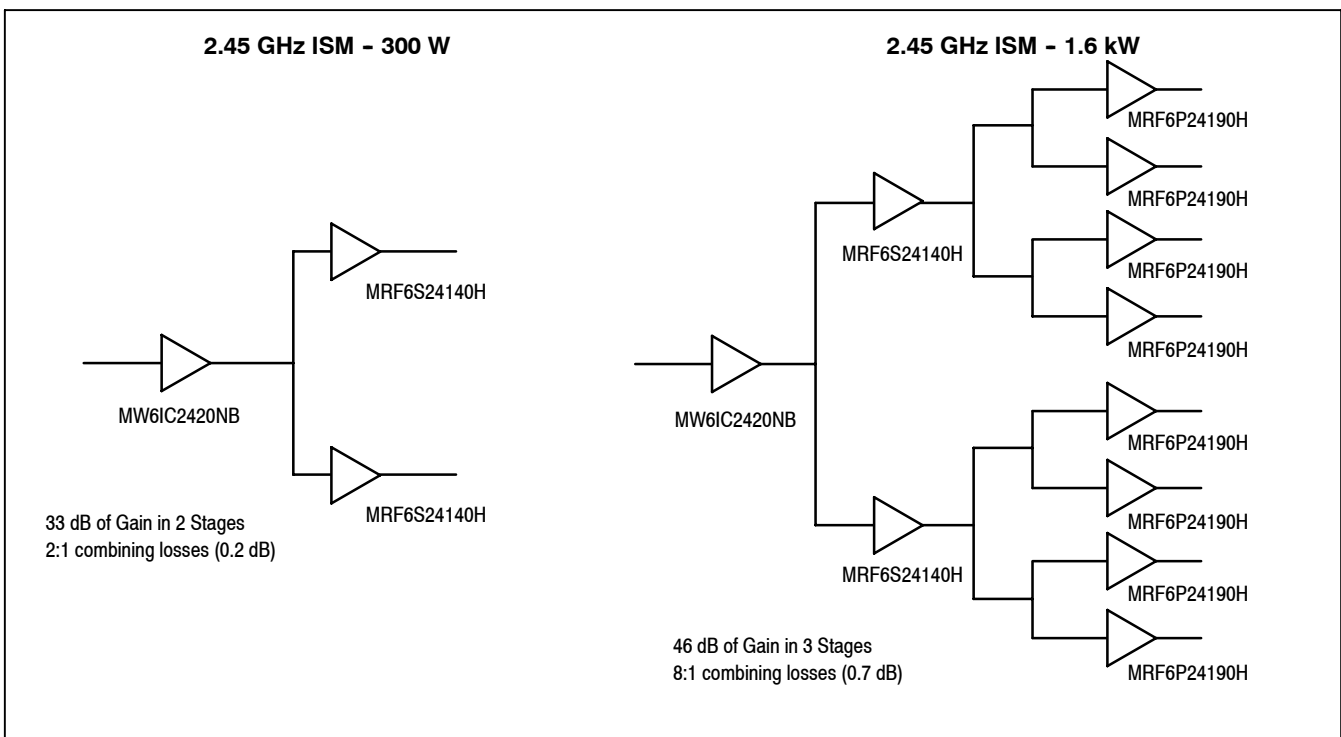
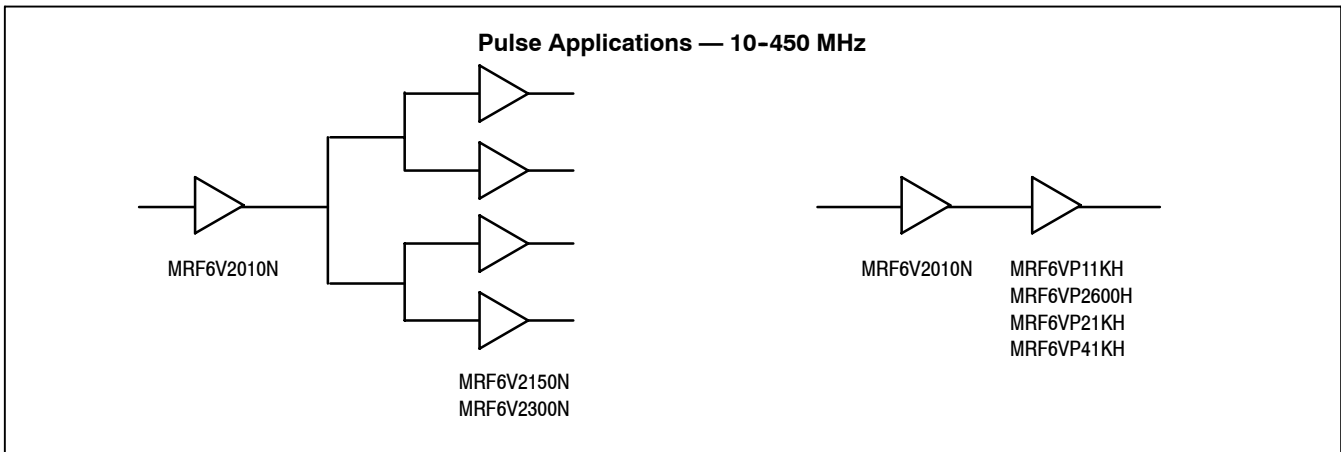
Air Cavity	MRF35010A	MRF7S38040H
	MRF35020A	MRF7S38075H
	MRF7S38010H	

Over-Molded Plastic	MMG3014N	MRF35010AN
	MRF35002N6A	MW7IC3825N
	MRF35003N6A	
	MRF35003AN	
	MRF35005AN	

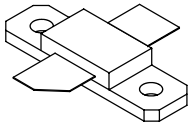
RF High Power Amplifier Line-ups (continued)



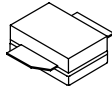
RF High Power Amplifier Line-ups (continued)



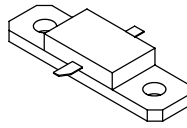
RF Transistor Packages



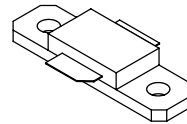
CASE 360B
STYLE 1
(NI-360)



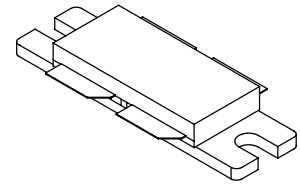
CASE 360C
STYLE 1
(NI-360S)



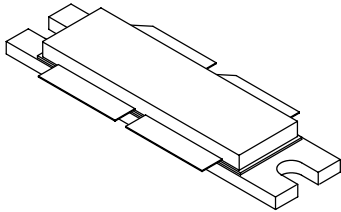
CASE 360D
STYLE 1
(NI-360HF)



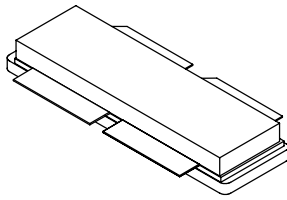
CASE 360E
STYLE 1
(NI-360 Short Lead)



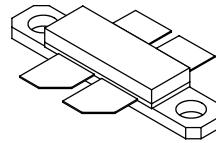
CASE 375B
STYLE 1
(NI-860)



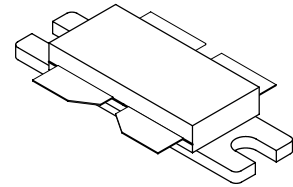
CASE 375D
STYLE 1
(NI-1230)



CASE 375E
STYLE 1
(NI-1230S)



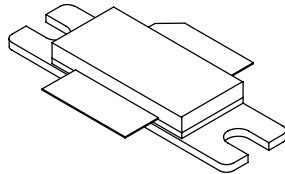
CASE 375F
STYLE 1
(NI-650)



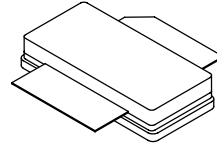
CASE 375G
STYLE 1
(NI-860C3)



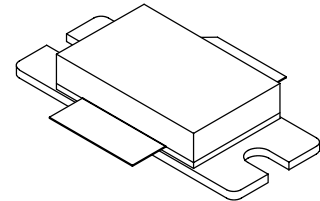
CASE 449
STYLE 1
(PLD-1)



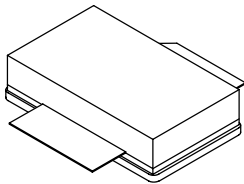
CASE 465
STYLE 1
(NI-780)



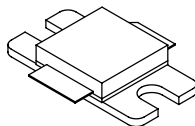
CASE 465A
STYLE 1
(NI-780S)



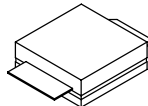
CASE 465B
STYLE 1
(NI-880)



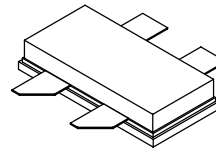
CASE 465C
STYLE 1
(NI-880S)



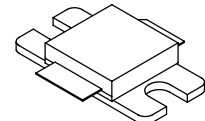
CASE 465E
STYLE 1
(NI-400)



CASE 465F
STYLE 1
(NI-400S)



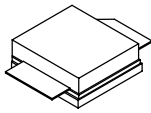
CASE 465H
STYLE 1
(NI-780S-4)



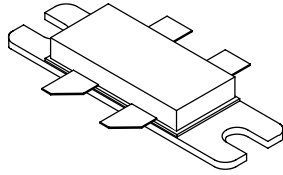
CASE 465I
STYLE 1
(NI-400-240)

SCALE 1:1

RF Transistor Packages (continued)



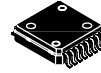
CASE 465J
STYLE 1
(NI-400S-240)



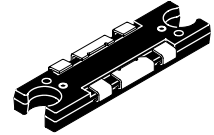
CASE 465M-01
STYLE 1
(NI-780-4)



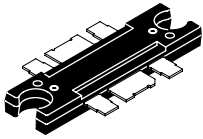
CASE 466
STYLE 1
PLASTIC
(PLD-1.5)



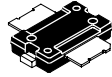
CASE 978
PLASTIC
(PFP-16)



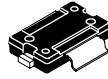
CASE 1264
STYLE 1
PLASTIC
(TO-272-6 Wrap)



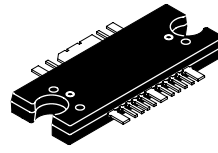
CASE 1264A
STYLE 1
PLASTIC
(TO-272-6)



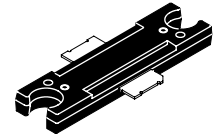
CASE 1265
STYLE 1
PLASTIC
(TO-270-2)



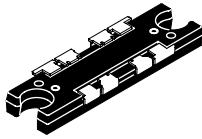
CASE 1265A
STYLE 1
PLASTIC
(TO-270-2 Gull)



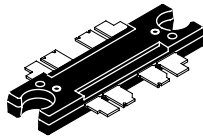
CASE 1329
STYLE 1
PLASTIC
(TO-272 WB-16)



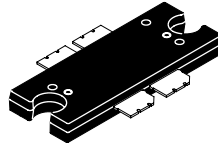
CASE 1337
STYLE 1
PLASTIC
(TO-272-2)



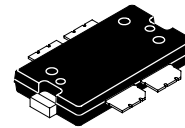
CASE 1366
STYLE 1
PLASTIC
(TO-272-8 Wrap)



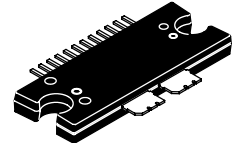
CASE 1366A
STYLE 1
PLASTIC
(TO-272-8)



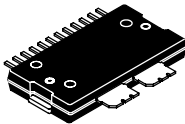
CASE 1484
STYLE 1
PLASTIC
(TO-272 WB-4)



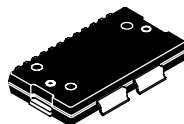
CASE 1486
STYLE 1
PLASTIC
(TO-270 WB-4)



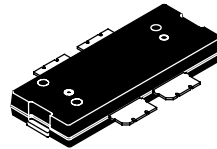
CASE 1617
PLASTIC
(TO-272 WB-14)



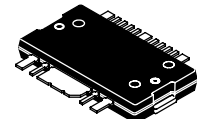
CASE 1618
PLASTIC
(TO-270 WB-14)



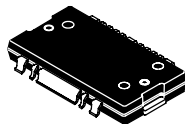
CASE 1621
PLASTIC
(TO-270 WB-14 Gull)



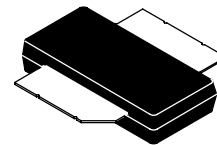
CASE 1730
PLASTIC
(TO-270 WBL-4)



CASE 1886
PLASTIC
(TO-270 WB-16)



CASE 1887
PLASTIC
(TO-270 WB-16 Gull)



CASE 2021
PLASTIC
(OM780-2)

SCALE 1:1

RF Amplifier ICs and Modules

Freescale Semiconductor's RF portfolio includes IC designs optimized for wideband applications. For PA designers, IC driver devices offer the benefits of multiple gain stages in one package with most of the decoupling and matching circuitry incorporated into a single low-cost plastic device.

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RF Amplifier ICs and Modules

Complete amplifiers with 50 ohm input impedances are available for all popular base station transmitter systems, including GSM and CDMA, covering frequencies from 800 MHz up to 2.2 GHz.

Base Stations

Designed for applications such as macrocell drivers and microcell output stage, these Class AB amplifiers are ideal for base station systems with power requirements up to 112 watts.

Table 1. Base Station IC Drivers — Class AB

Product	Frequency MHz	P1dB Watts	Gain (Typ) dB	Supply Voltage Volts	System Application	Die Technology	Pkg/Style
MHVIC915NR2 ^(18e)	746-960	15	30	26	N-CDMA, GSM/GSM EDGE	LDMOS	978/- (PFP-16)
MWIC930NR1 ^(18a)	746-960	30	30	27	N-CDMA, GSM/GSM EDGE	LDMOS	1329/- (TO-272 WB-16)
MWIC930GNR1 ^(18a)	746-960	30	30	27	N-CDMA, GSM/GSM EDGE	LDMOS	1329A/- (TO-272 WB-16 Gull)
MW4IC915NBR1 ^(18a)	860-960	15	30	26	N-CDMA, GSM/GSM EDGE	LDMOS	1329/- (TO-272 WB-16)
MW4IC915GNBR1 ^(18a)	860-960	15	30	26	N-CDMA, GSM/GSM EDGE	LDMOS	1329A/- (TO-272 WB-16 Gull)
MWE6IC9100NR1 ^(18a)	869-960	112	33.5	26	GSM/GSM EDGE	LDMOS	1618/- (TO-270 WB-14)
MWE6IC9100GNR1 ^(18a)	869-960	112	33.5	26	GSM/GSM EDGE	LDMOS	1621/- (TO-270 WB-14 Gull)
MWE6IC9100NBR1 ^(18a)	869-960	112	33.5	26	GSM/GSM EDGE	LDMOS	1617/- (TO-272 WB-14)
MHVIC910HNR2 ^(18e)	921-960	10	39	26	GSM900	LDMOS	978/- (PFP-16)
MHV5IC1810NR2 ^(18e)	1805-1990	10	29	28	GSM/GSM EDGE	LDMOS	978/- (PFP-16)
MW6IC2015NBR1 ^(18a)	1805-1990	15	26	26	GSM/GSM EDGE	LDMOS	1329/- (TO-272 WB-16)
MW6IC2015GNBR1 ^(18a)	1805-1990	15	26	26	N-CDMA, W-CDMA GSM/GSM EDGE	LDMOS	1329A/- (TO-272 WB-16 Gull)
MW4IC2020NBR1 ^(18a)	1805-1990	20	29	26	N-CDMA, GSM/GSM EDGE	LDMOS	1329/- (TO-272 WB-16)
MW4IC2020GNBR1 ^(18a)	1805-1990	20	29	26	N-CDMA, GSM/GSM EDGE	LDMOS	1329A/- (TO-272 WB-16 Gull)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

RF Amplifier ICs and Modules: Base Stations (continued)

Table 1. Base Station IC Drivers — Class AB (continued)

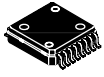
Product	Frequency MHz	P1dB Watts	Gain (Typ) dB	Supply Voltage Volts	System Application	Die Technology	Pkg/Style
MW7IC18100NR1 ^(18a)	1805–2050	100	30	28	GSM/GSM EDGE	LDMOS	1618/- (TO-270 WB-14)
MW7IC18100GNR1 ^(18a)	1805–2050	100	30	28	GSM/GSM EDGE	LDMOS	1621/- (TO-270 WB-14 Gull)
MW7IC18100NBR1 ^(18a)	1805–2050	100	30	28	GSM/GSM EDGE	LDMOS	1617/- (TO-272 WB-14)
MHV5IC2215NR2 ^(18e)	1930–1990	15	27.5	28	N-CDMA	LDMOS	978/- (PFP-16)
	2130–2170	15	24	28	W-CDMA	LDMOS	978/- (PFP-16)
MW5IC2030NBR1 ^(18a)	1930–1990	30	23	27	GSM/GSM EDGE, W-CDMA, PHS	LDMOS	1329/- (TO-272 WB-16)
MW5IC2030GNBR1 ^(18a)	1930–1990	30	23	27	GSM/GSM EDGE, W-CDMA, PHS	LDMOS	1329A/- (TO-272 WB-16 Gull)
MW6IC1940NBR1 ^(18a)	1920–2000	40	27	28.5	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW6IC1940GNBR1 ^(18a)	1920–2000	40	27	28.5	W-CDMA	LDMOS	1329A/- (TO-272 WB-16 Gull)
MHVIC2114NR2 ^(18e)	2110–2170	15	32	27	W-CDMA	LDMOS	978/- (PFP-16)
MW7IC2220N ^(46a)	2110–2170	20	31	28	W-CDMA	LDMOS	1886/- (TO-270 WB-16)
MW7IC2220GN ^(46a)	2110–2170	20	31	28	W-CDMA	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC2220NB ^(46a)	2110–2170	20	31	28	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW4IC2230NBR1 ^(18a)	2110–2170	30	31.5	28	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW4IC2230GNBR1 ^(18a)	2110–2170	30	31.5	28	W-CDMA	LDMOS	1329A/- (TO-272 WB-16 Gull)
MW6IC2240NBR1 ^(18a)	2110–2170	40	28	28	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW6IC2240GNBR1 ^(18a)	2110–2170	40	28	28	W-CDMA	LDMOS	1329A/- (TO-272 WB-16 Gull)
MW7IC2240NR1 ^{(18a)★}	2110–2170	40	30.9	28	W-CDMA	LDMOS	1886/- (TO-270 WB-16)
MW7IC2240GNR1 ^{(18a)★}	2110–2170	40	30.9	28	W-CDMA	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC2240NBR1 ^{(18a)★}	2110–2170	40	30.9	28	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW7IC2725NR1 ^{(18a)★}	2700	25	27.5	28	WiMAX	LDMOS	1886/- (TO-270 WB-16)
MW7IC2725GNR1 ^{(18a)★}	2700	25	27.5	28	WiMAX	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC2725NB ^(46b)	2700	25	27.5	28	WiMAX	LDMOS	1329/- (TO-272 WB-16)
MW7IC2750NR1 ^{(18a)★}	2700	50	26	28	WiMAX	LDMOS	1618/- (TO-270 WB-14)
MW7IC2750GNR1 ^{(18a)★}	2700	50	26	28	WiMAX	LDMOS	1621/- (TO-270 WB-14 Gull)
MW7IC2750NBR1 ^{(18a)★}	2700	50	26	28	WiMAX	LDMOS	1617/- (TO-272 WB-14)
MW7IC3825N ^(46a)	3400–3800	25	23.5	28	WiMAX	LDMOS	1886/- (TO-270 WB-16)
MW7IC3825GN ^(46a)	3400–3800	25	23.5	28	WiMAX	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC3825NB ^(46a)	3400–3800	25	23.5	28	WiMAX	LDMOS	1329/- (TO-272 WB-16)

⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

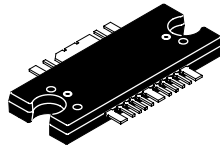
⁽⁴⁶⁾To be introduced: a) 2Q08; b) 3Q08; c) 1Q09.

★New Product

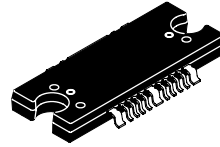
RF Amplifier ICs and Modules Packages



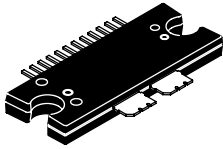
CASE 978
PLASTIC
(PFP-16)



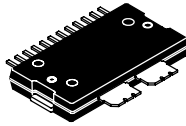
CASE 1329
STYLE 1
PLASTIC
(TO-272 WB-16)



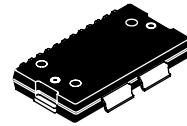
CASE 1329A
STYLE 1
PLASTIC
(TO-272 WB-16 Gull)



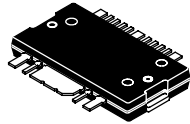
CASE 1617
PLASTIC
(TO-272 WB-14)



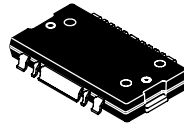
CASE 1618
PLASTIC
(TO-270 WB-14)



CASE 1621
PLASTIC
(TO-270 WB-14 Gull)



CASE 1886
PLASTIC
(TO-270 WB-16)



CASE 1887
PLASTIC
(TO-270 WB-16 Gull)

SCALE 1:1

RF General Purpose Amplifiers

Freescale Semiconductor general purpose amplifiers are designed to address a broad range of general purpose RF and IF applications where linearity and dynamic range are essential.

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RF General Purpose Amplifiers

These devices have been optimized for 50 ohm applications and are designed for multi-purpose applications where linearity and dynamic range are of primary concern.

Table 1. General Purpose Amplifiers — Class A — GaAs HFET, InGaP HBT

Product	Frequency Band MHz	Supply Voltage (Typ) Volts	Supply Current (Typ) mA	Small Signal Gain (Typ) @ 900 MHz dB	P _{1dB} (Typ) @ 900 MHz dBm	3rd Order Intercept (Typ) dBm	NF (Typ) @ 900 MHz dB	θ _{JC} °C/W	Pkg/Style
MMG3008NT1 ^(18f)	0-6000	5	38	18.5	15	26	4	84	1514/1
MMG3011NT1 ^(18f)	0-6000	5	41	15	15	28	4.6	83	1514/1
MMG3007NT1 ^(18f)	0-6000	5	47	19	16	30	3.8	77	1514/1
MMG3009NT1 ^(18f)	0-6000	5	70	15	18	34	4.2	81	1514/1
MMG3012NT1 ^(18f)	0-6000	5	70	19	18.5	34	3.8	85	1514/1
MMG3015NT1 ^(18f)	0-6000	5	95	15.5	20.5	36	5.6	41.5	1514/1
MMG3H21NT1 ^{(18f)★}	0-6000	5	90	19.3	20.5	37	5.5	38.6	1514/1
MMH3111NT1 ^{(18f)★}	250-4000	5	150	12	22.5	44	3.2	37.5	1514/2
MMG3014NT1 ^{(18f)★}	40-4000	5	135	19.5	25	40.5	5.7	27.4	1514/1
MMG3004NT1 ^(18f)	400-2200	5	250	16*	27*	44*	3.4*	33	1543/-
MMG3005NT1 ^(18f)	800-2200	5	480	15*	30*	47*	5*	21.5	1543/-
MMG3006NT1 ^{(18f)★}	400-2400	5	850	17.5	33	49	6.6	7.8	1898/-
				*@ 2140 MHz	*@ 2140 MHz	*@ 2140 MHz	*@ 2140 MHz		

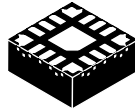
⁽¹⁸⁾Tape and Reel Packaging Options: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units; i) R3 = 250 units; j) T1 = 500 units; k) R2 = 450 units; l) T1 = 5,000 units; m) R2 = 2,000 units; n) R4 = 100 units; o) R6 = 150 units; p) R5 = 50 units.

RF General Purpose Amplifiers Packages



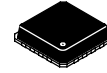
CASE 1514
STYLE 1, 2
PLASTIC
(SOT-89)

SCALE 2:1



CASE 1543
PLASTIC
(PQFN 5x5)

SCALE 2:1



CASE 1898
PLASTIC
(QFN 4x4)

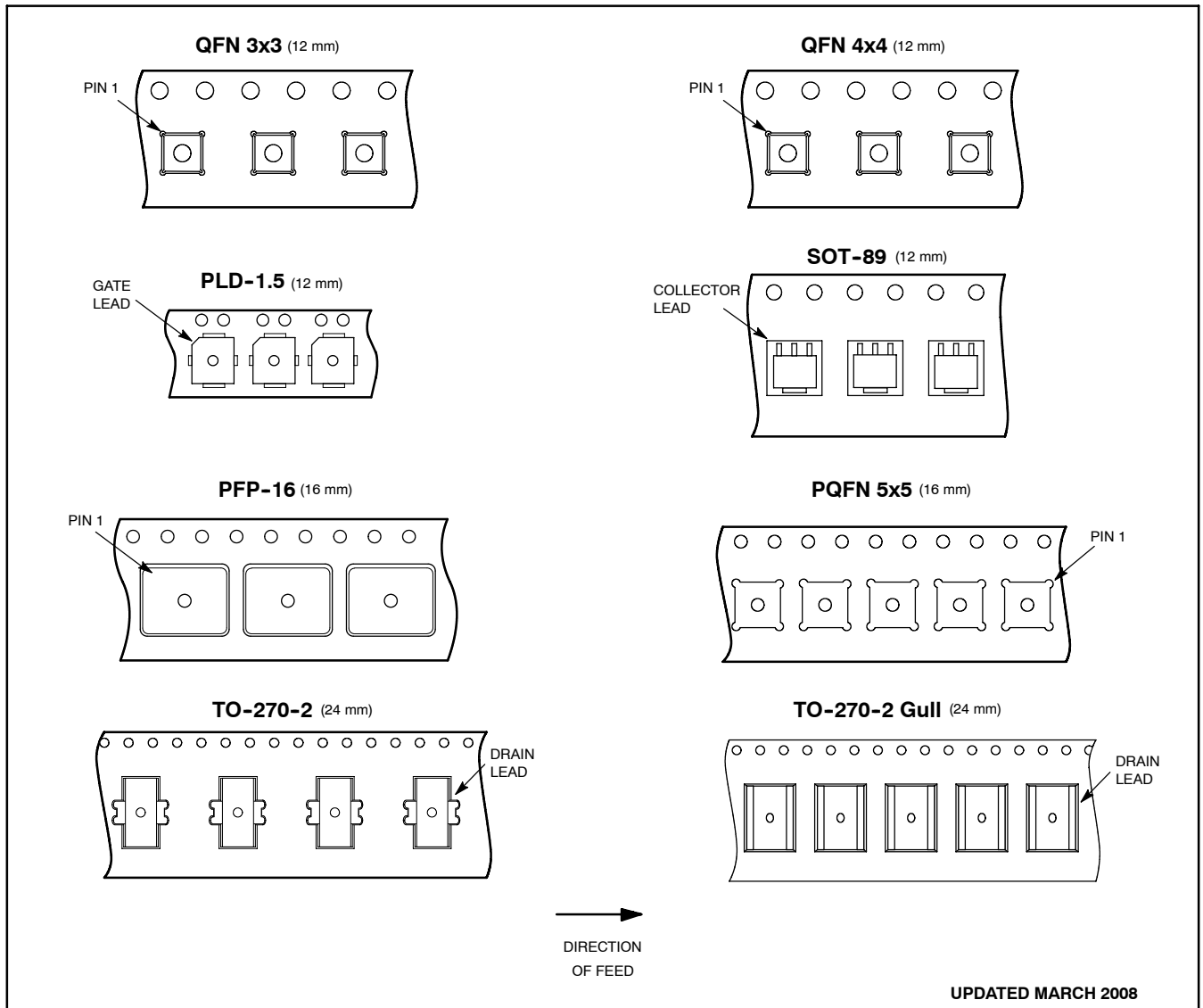
SCALE 2:1

RF Tape and Reel Specifications

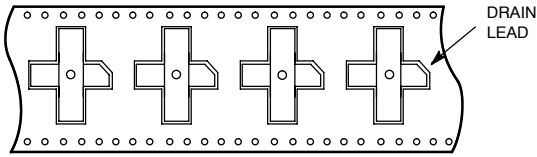
Embossed Tape and Reel is used to facilitate automatic pick and place equipment feed requirements. The tape is used as the shipping container for various products and requires a minimum of handling. The antistatic/conductive tape provides a secure cavity for the product when sealed with the “peel-back” cover tape.

- Two Reel Sizes Available (7” and 13”)
- Used for Automatic Pick and Place Feed Systems
- Minimizes Product Handling
- EIA 481, -1, -2
- SOT-363 in 8 mm Tape
- PLD-1.5, QFN 3x3, QFN 4x4, SOT-89 in 12 mm Tape
- PFP-16, PQFN 5x5 in 16 mm Tape
- TO-270-2, TO-270-2 Gull in 24 mm Tape
- NI-360, NI-360HF, NI-360S, NI-400, NI-400S in 32 mm Tape
- TO-270 WB-4, TO-270 WBL-4, TO-270 WB-14, TO-270 WB-14 Gull, TO-270 WB-16, TO-270 WB-16 Gull, TO-272-2, TO-272-6, TO-272-6 Wrap, TO-272-8, TO-272-8 Wrap, TO-272 WB-4, TO-272 WB-14, TO-272 WB-16, TO-272 WB-16 Gull, in 44 mm Tape
- NI-780, NI-780S, NI-860, NI-880, NI-880S, NI-1230, NI-1230S in 56 mm Tape

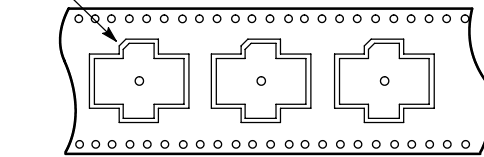
Use the standard device title and add the required suffix as listed in the option table on the following page. Note that the individual reels have a finite number of devices depending on the type of product contained in the tape. Also note the minimum lot size is one full reel for each line item, and orders are required to be in increments of the single reel quantity.



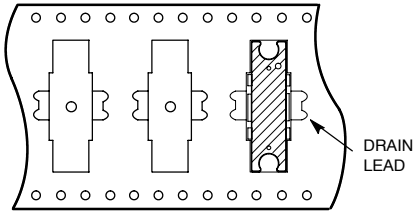
NI-360, NI-360HF, NI-360S (32 mm)



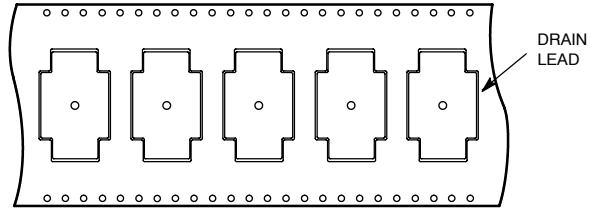
NI-400, NI-400S (32 mm)



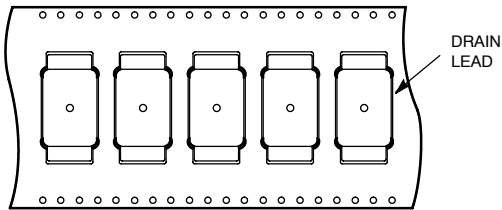
TO-272-2, TO-272-6 Wrap, TO-272-6, TO-272-8, TO-272-8 Wrap (44 mm)



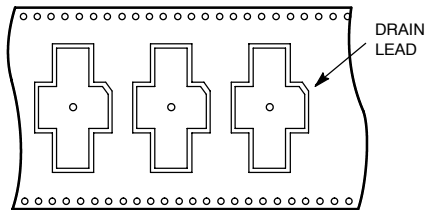
TO-270 WB-4, TO-270 WBL-4, TO-270 WB-14, TO-270 WB-16, TO-272 WB-4, TO-272 WB-14, TO-272 WB-16 (44 mm)



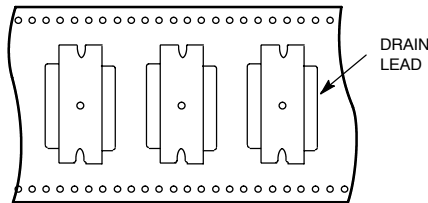
TO-270 WB-14 Gull, TO-270 WB-16 Gull, TO-272 WB-16 Gull (44 mm)



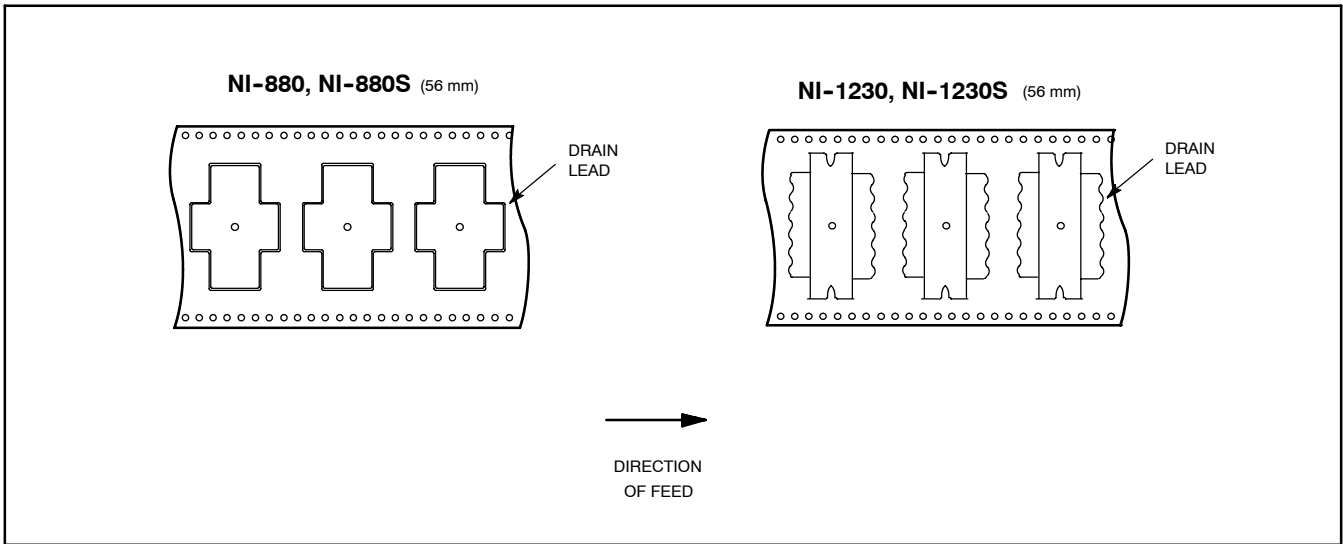
NI-780, NI-780S (56 mm)



NI-860 (56 mm)



DIRECTION OF FEED

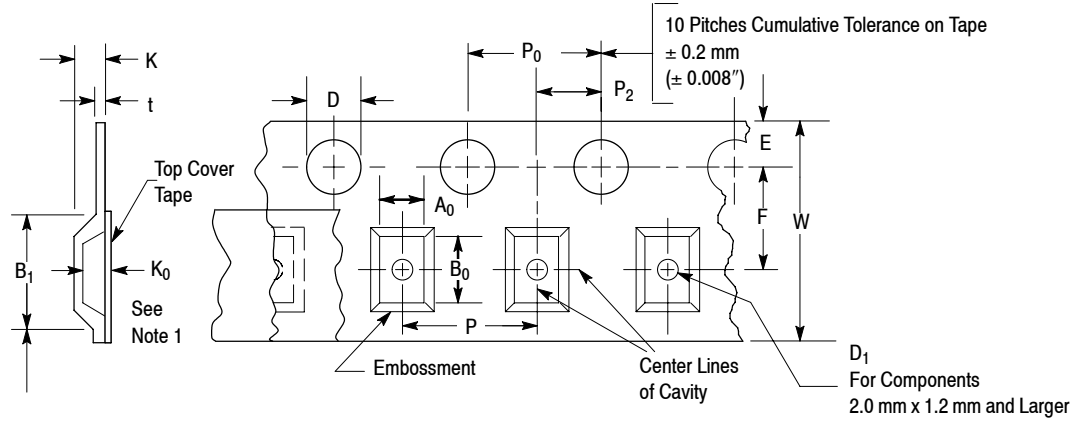


RF EMBOSSED TAPE AND REEL ORDERING INFORMATION

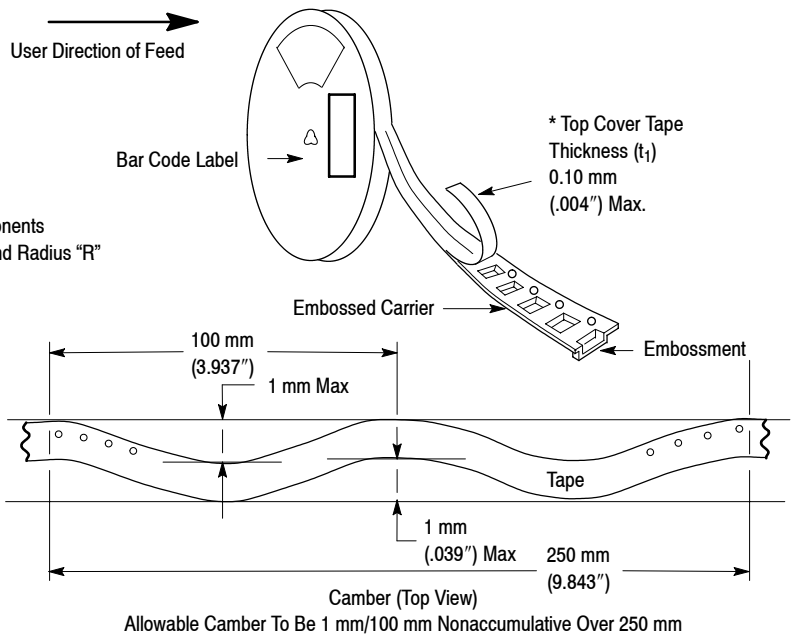
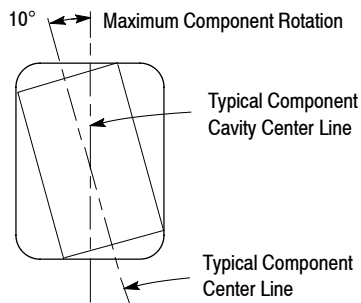
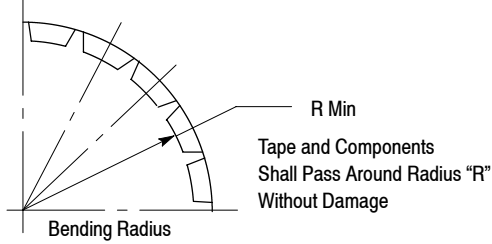
Package	Tape Width (mm)	Pitch (mm (inch))	Reel Size (mm (inch))	Devices Per Reel and Minimum Order Quantity	Device Suffix
NI-360 (360B)	32	24.0 ± 0.1 (.945 ± .004)	330 (13)	500	R1
NI-360HF (360D)	32	24.0 ± 0.1 (.945 ± .004)	330 (13)	500 50	R1 R5
NI-360S (360C)	32	24.0 ± 0.1 (.945 ± .004)	330 (13)	500	R1
NI-400 (465E)	32	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-400S (465F)	32	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-780 (465)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-780S (465A)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-860 (375B, 375G) (375G)	56 56	28.0 ± 0.1 (1.10 ± .004) 28.0 ± 0.1 (1.10 ± .004)	330 (13) 330 (13)	250 50	R3 R5
NI-880 (465B)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-880S (465C)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-1230 (375D)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	150	R6
NI-1230S (375E)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	150	R6
PPF-16 (978)	16	12.0 ± 0.1 (.472 ± .004)	330 (13)	1,500	R2
PLD-1.5 (466)	12 12	8.0 ± 0.1 (.315 ± .004) 8.0 ± 0.1 (.315 ± .004)	178 (7) 178 (7)	1,000 100	T1 R4
PQFN 5x5 (1543)	16	8.0 ± 0.1 (.315 ± .004)	330 (13)	1,000	T1
QFN 3x3 (1483)	12	8.0 ± 0.1 (.315 ± .004)	178 (7)	1,500	R2
QFN 4x4 (1898)	12	8.0 ± 0.1 (.315 ± .004)	330 (13)	1,000	T1
SOT-89 (1514)	12	8.0 ± 0.1 (.315 ± .004)	178 (7)	1,000	T1
SOT-363	8	4.0 ± 0.1 (.157 ± .004)	178 (7)	3,000	T1
TO-270-2 (1265)	24	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	R1
TO-270-2 Gull (1265A)	24	12.0 ± 0.1 (.471 ± .004)	330 (13)	500	R1
TO-270 WB-4 (1486)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-270 WBL-4 (1730)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-270 WB-14 (1618)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-270 WB-14 Gull (1621)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	R1
TO-270 WB-16 (1886)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-270 WB-16 Gull (1887)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	R1
TO-272-2 (1337)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	R1
TO-272-6 (1264A)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	T1
TO-272-6 Wrap (1264)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	T1
TO-272-8 (1366A)	44	20.0 ± 0.1 (.787 ± .004)	330 (13)	500	T1
TO-272-8 Wrap (1366)	44	20.0 ± 0.1 (.787 ± .004)	330 (13)	500	T1
TO-272 WB-4 (1484)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-272 WB-14 (1617)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-272 WB-16 (1329)	44	20.0 ± 0.1 (.788 ± .004)	330 (13)	500	R1
TO-272 WB-16 Gull (1329A)	44	16.0 ± 0.1 (.631 ± .004)	330 (13)	500	R1

EMBOSSED TAPE AND REEL DATA FOR DISCRETES

CARRIER TAPE SPECIFICATIONS



For Machine Reference Only
 Including Draft and RADII
 Concentric Around B_0



DIMENSIONS

Tape Size	B ₁ Max	D	D ₁	E ₁	F	K	P ₀	P ₂	R Min	t Max	W Max			
12 mm	8.2 mm (.323")	1.5±0.1 mm -0.0 (.059±.004" -0.0)	1.5 mm Min (.060")	1.75±0.1 mm (.069±.004")	5.5±0.05 mm (.217±.002")	6.4 mm Max (.252")	4.0±0.1 mm (.157±.004")	2.0±0.1 mm (.079±.004")	30 mm (1.18")	0.4 mm (.016")	12±.30 mm (.470±.012")			
	4.0 mm (.157") QFN 3x3											1.2 mm Max (.048") QFN 3x3 QFN 4x4	2.0±0.5 mm (.079±.002")	0.30 mm (.012")
	4.45 mm (.175") QFN 4x4													
	5.1 mm (.201") SOT-89		1.7 mm Min (.068") SOT-89											
16 mm	12.1 mm (.476")	1.5 mm Min (.060")	1.5 mm Min (.060")	7.5±0.10 mm (.295±.004")	7.9 mm Max (.311")	2.8 mm Max (.110") PQFN 5x5	4.0±0.2 mm (.157±.001") PQFN 5x5	2.0±0.5 mm (.079±.002") PQFN 5x5	0.4 mm (.016")	16±.3 mm (.642±.008")				
	6.1 mm (.241") PQFN 5x5										2.0±0.1 mm (.079±.004")	2.0±0.5 mm (.079±.002") PQFN 5x5	0.30 mm (.012") PQFN 5x5	
24 mm	20.1 mm (.791")	1.5 mm Min (.059")	1.5 mm Min (.059")	14.2±0.1 mm (.559±.004")	4.6 mm (.181") NI-360/HF/S	4.3 mm (.169") NI-400/S	5.34 mm (.210") NI-600/S	2.0±0.1 mm (.079±.004")	50 mm (1.969")	0.6 mm (.024")	32.2 mm (1.272")			
	11.1 mm (.437") TO-270-2 Gull											11.5±0.1 mm (.453±.004")	11.9 mm Max (.468")	2.82 mm Max (.111") TO-270-2 Gull
32 mm	23.0 mm (.906")	1.5 mm Min (.059")	1.5 mm Min (.059")	11.5±0.1 mm (.453±.004")	15.9 mm Max (.625")	20.2±0.15 mm (0.796±.006")	2.92 mm (.115") TO-272 WB-4, TO-272 WB-16	20.0±0.1 mm (.788±.004") TO-272 WB-4, TO-272 WB-16	2.0±0.15 mm (.079±.006")	.318 mm (.012") TO-272 WB-4, TO-272 WB-16	44±.30 mm (1.732±.012")			
	24.0 mm (.946") TO-270 WBL-4, TO-272 WB-4, TO-270 WB-14, TO-270 WB-16, TO-272 WB-14, TO-272 WB-16											4.6 mm (.181") NI-360/HF/S	4.3 mm (.169") NI-400/S	5.34 mm (.210") NI-600/S
44 mm	35.0 mm (1.378")	2.0 mm Min (.079")	2.0 mm Min (.079")	11.5±0.1 mm (.453±.004")	15.9 mm Max (.625")	20.2±0.15 mm (0.796±.006")	2.92 mm (.115") TO-272 WB-4, TO-272 WB-16	20.0±0.1 mm (.788±.004") TO-272 WB-4, TO-272 WB-16	2.0±0.15 mm (.079±.006")	.343 mm (.013") TO-272 WB-16 Gull	44±.30 mm (1.732±.012")			
	23.77 mm (.936") TO-270 WB-14 Gull, TO-270 WB-16 Gull, TO-272 WB-16 Gull											3.20 mm (.126") TO-272 WB-16 Gull	16.0±0.1 mm (.630±.004") TO-272 WB-16 Gull	0.4 mm (.016")

Metric dimensions govern — English are in parentheses for reference only.

NOTE 1: A₀, B₀, and K₀ are determined by component size. The clearance between the components and the cavity must be within .05 mm min. to .50 mm max., the component cannot rotate more than 10° within the determined cavity.

NOTE 2: Pitch information is contained in the Embossed Tape and Reel Ordering Information on pg. 46.

DIMENSIONS (continued)

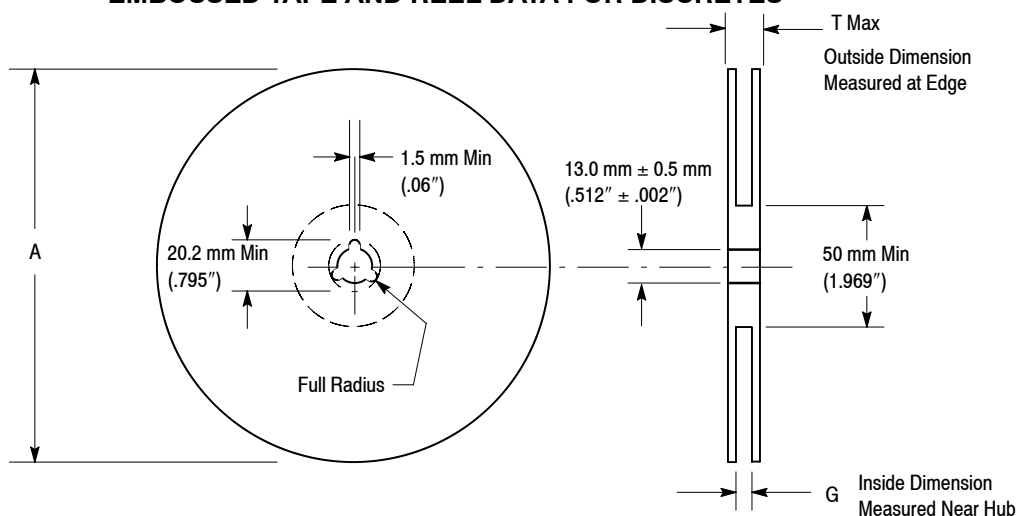
Tape Size	B ₁ Max	D	D ₁	E ₁	F	K	P ₀	P ₂	R Min	t Max	W Max
56 mm	34.7 mm (1.366") NI-780/S NI-860 NI-880/S	1.5+0.1 mm -0.0 (.059+.004" -0.0)	2.0 mm Min (.079")	1.75±0.1 mm (.069±.004")	26.2 ±0.15 mm (1.031±.006")	4.5 mm (0.177") NI-780/S	4.0±0.1 mm (.157±.004")	2.0±0.15 mm (.079±.006")		0.6 mm (.024") NI-780/S NI-860 NI-880/S NI-1230	56±.30 mm (2.205± .012")
	5.0 mm (0.197") NI-860										
	5.23 mm (0.206") NI-880/S										
	5.2 mm (0.205") NI-1230										
	41.6 mm (1.638") NI-1230										

Metric dimensions govern — English are in parentheses for reference only.

NOTE 1: A₀, B₀, and K₀ are determined by component size. The clearance between the components and the cavity must be within .05 mm min. to .50 mm max., the component cannot rotate more than 10° within the determined cavity.

NOTE 2: Pitch information is contained in the Embossed Tape and Reel Ordering Information on pg. 46.

EMBOSSED TAPE AND REEL DATA FOR DISCRETES



Size	A Max	G	T Max
12 mm	330 mm (12.992")	12.4 mm + 2.0 mm, -0.0 (.49" + .079", -0.00)	18.4 mm (.72")
12 mm QFN 3x3 QFN 4x4	178 mm (7")	12.4 mm + 2.0 mm, -0.0 (.49" + .079", -0.00)	18.4 mm (.72")
12 mm SOT-89	178 mm (7")	13.5 mm (.53")	16.5 mm (.65")
16 mm	330 mm (14.173")	16.4 mm + 2.0 mm, -0.0 (.646" + .078", -0.00)	22.4 mm (.882")
16 mm PQFN 5x5	360 mm (14.173")	16.4 mm + 2.0 mm, -0.0 (.646" + .078", -0.00)	22.4 mm (.882")
24 mm	360 mm (14.173")	24.4 mm + 2.0 mm, -0.0 (.961" + .070", -0.00)	30.4 mm (1.197")
24 mm TO-270-2 Gull	330 mm (12.992")	24.4 mm + 2.0 mm, -0.0 (.961" + .070", -0.00)	30.4 mm (1.197")
32 mm	360 mm (14.163")	32.4 mm + 2.0 mm, -0.0 (1.276" + 0.79", -0.00)	38.4 mm (1.512")
44 mm	330 mm (12.992")	44.4 mm + 2.0 mm, -0.0 (1.748" + 0.79", -0.00)	50.4 mm (1.984")
44 mm TO-270 WB-4, WBL-4, WB-14, WB-14 Gull, WB-16, WB-16 Gull, TO-272 WB-4, WB-14, WB-16, WB-16 Gull	330 mm (12.992")	45.3 mm + 0.5 mm, -0.0 (1.785" + 0.02", -0.00)	50.4 mm (1.984")
56 mm	330 mm (12.992")	56.4 mm + 2.0 mm, -0.0 (2.220" + 0.79", -0.00)	62 mm (2.441")

Reel Dimensions

Metric Dimensions Govern — English are in parentheses for reference only

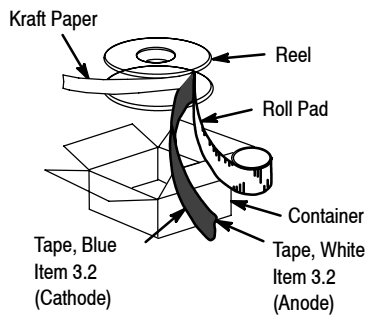


Figure 1. Reel Packing

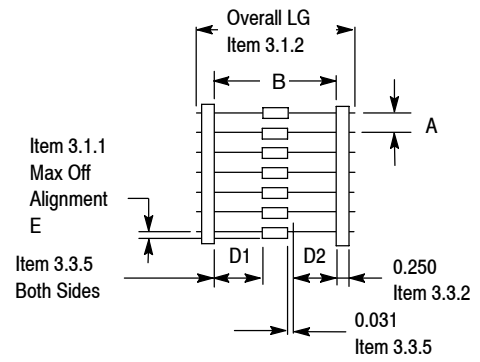


Figure 2. Component Spacing

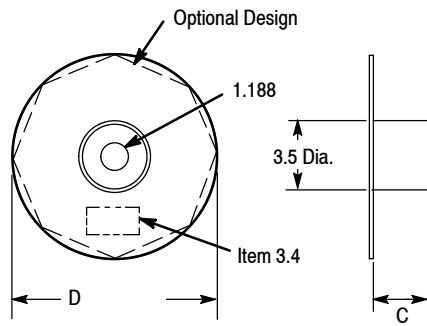


Figure 3. Reel Dimensions

Applications and Product Literature

Application Notes and Engineering Bulletins of special interest to designers of RF equipment are listed below. This technical documentation is available on the Freescale Semiconductor Product Sector Web site or is available through the Freescale Semiconductor Literature Distribution Center. Phone and fax numbers for ordering literature are listed on the back cover of this book and in our Accessing Data On-line section.

Application Notes

- | | | | |
|--------|---|--------|---|
| AN211A | Field Effect Transistors in Theory and Practice | AN1923 | Mounting Method with Mechanical Fasteners for the MRF19090 and Similar Packages |
| AN419 | UHF Amplifier Design Using Data Sheet Design Curves | AN1938 | Sensitivity of High Power RF Transistors to Source and Output Loads |
| AN423 | Field Effect Transistor RF Amplifier Design Techniques | AN1941 | Modeling Thermal Effects in RF LDMOS Transistors |
| AN548A | Microstrip Design Techniques for UHF Amplifiers | AN1944 | Generating Temperature-Dependent IV Curves Using ADS |
| AN721 | Impedance Matching Networks Applied to RF Power Transistors | AN1949 | Mounting Method for the MHVIC910HR2 (PFP-16) and Similar Surface Mount Packages |
| AN923 | 800 MHz Test Fixture Design | AN1955 | Thermal Measurement Methodology of RF Power Amplifiers |
| AN1032 | How Load VSWR Affects Non-Linear Circuits | AN1977 | Quiescent Current Thermal Tracking Circuit in the RF Integrated Circuit Family |
| AN1033 | Match Impedances in Microwave Amplifiers | AN1987 | Quiescent Current Control for the RF Integrated Circuit Device Family |
| AN1034 | Three Balun Designs for Push-Pull Amplifiers | AN3100 | General Purpose Amplifier Biasing |
| AN1526 | RF Power Device Impedances: Practical Considerations | AN3263 | Bolt Down Mounting Method for High Power RF Transistors and RFICs in Over-Molded Plastic Packages |
| AN1530 | Advanced Amplifier Concept Package | AN4005 | Thermal Management and Mounting Method for the PLD 1.5 RF Power Surface Mount Package |
| AN1617 | Mounting Recommendations for Copper Tungsten Flanged Transistors | | |
| AN1643 | RF LDMOS Power Modules for GSM Base Station Application: Optimum Biasing Circuit | | |
| AN1670 | 60 Watts, GSM 900 MHz, LDMOS Two-Stage Amplifier | | |
| AN1696 | Broadband Intermodulation Performance Development Using the Rohde & Schwarz Vector Network Analyzer ZVR | | |
| AN1697 | GSM900/DCS/1800 Dual-Band 3.6 V Power Amplifier Solution with Open Loop Control Scheme | | |
| AN1907 | Solder Reflow Attach Method for High Power RF Devices in Plastic Packages | | |
| AN1908 | Solder Mounting Method for the MRF19090S and Similar Packages | | |

Product Literature

- | | |
|-----------|--|
| BR1593 | Industrial, Scientific and Medical Solutions |
| BR1606 | GPA Solutions |
| BR1607 | Broadcast Solutions |
| RFWIMAXFS | WiMAX RF Power Solutions |
| SG46 | RF Product Selector Guide |

SELECTOR GUIDE PRODUCT INDEX

Device Number	Page Number	Device Number	Page Number
MBC13720NT1	6	MRF5S4125NR1	12
MBC13916NT1	6	MRF5S9070NR1	12, 19
MC13821	6	MRF5S9080NBR1	13
MD7P19130HR3	15	MRF5S9080NR1	13
MD7P19130HSR3	15	MRF5S9100NBR1	13
MHV5IC1810NR2	36	MRF5S9100NR1	13
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MMG3011NT1	40	MRF6S18100NBR1	14
MMG3012NT1	40	MRF6S18100NR1	14
MMG3014NT1	40	MRF6S19060NBR1	14
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END OF LIFE RF PRODUCT INDEX

Freescale Semiconductor follows the industry standard “EIA-724 Product Life Cycle Data Model” to track the life cycle of its product. This model tracks the product’s life cycle from “Product Newly Introduced” to “Product Phase Out.” Products can be phased for a variety of reasons: improved product performance, change in technology roadmap, process obsolescence, market decline, etc. When products are

discontinued, a suggested possible replacement device or an alternative source of supply for discontinued devices are made available when possible.

For a list of discontinued devices with possible alternative suppliers, please contact your local Freescale sales office or authorized distributor.

Product	Last Order Date	Last Ship Date	Possible Replacement
Not Recommended for New Design			
MMG3001NT1	—	—	MMG3012NT1
MMG3002NT1	—	—	MMG3H21NT1
MMG3003NT1	—	—	MMG3014NT1
MMG3010NT1	—	—	MMG3007NT1
MMG3013NT1	—	—	MMG3H21NT1
MRF281SR1	—	—	MW6S004NT1
MRF281ZR1	—	—	MW6S004NT1
MRF282SR1	—	—	MHV5IC2215NR2, MRF6S20010NR1
MRF282ZR1	—	—	MHV5IC2215NR2, MRF6S20010GNR1
MRF373ALR1	—	—	MRFE6S9060NR1
MRF373ALSR1	—	—	MRFE6S9060NR1
MRF373LSR1	—	—	MRFE6S9060NR1
MRF9030LR1	—	—	MWIC930NR1, MRFE6S9045NR1
MRF9030NR1	—	—	MWIC930NR1, MRFE6S9045NR1
MRF9045LR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9045LSR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9045NR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9060LR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9060NR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9085LR3	—	—	MRF5S9080NBR3, MRFE6S9130HR3
MRF9135LSR3	—	—	MRFE6S9125NR1, MRFE6S9130HSR3
MRF9180R6	—	—	PRFE6S9200H
MRF9210R3	—	—	MRFE6P9220HR3
MRF18085ALSR3	—	—	MRF6S18100NR1, MRF7S19080HSR3, MRF6S19100NR1, MRF7S19100NR1
MRF19030LR3	—	—	MW5IC2030NBR1
MRF19085LR3	—	—	MRF7S19080HR3, MRF5S19090HR3, MRF7S19100NBR1, MRF6S19100HR3
MRF21010LSR1	—	—	MHV5IC2215NR2, MRF6S20010GNR1
MRF21030LR3	—	—	MRF5P21045NR1, MRF5S21045NBR1, MRF6S21050LR3, MW5IC2030NBR1, MW4IC2230NBR1, MW6IC2240NBR1
MRF21045LR3	—	—	MRF5P21045NR1, MRF5S21045NBR1, MRF6S21050LR3, MW6IC2240NBR1
MRF21045LSR3	—	—	MRF5P21045NR1, MRF5S21045NR1, MRF6S21050LSR3, MW6IC2240GNBR1

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life			
MHL8018	Past	Past	None
MHL8115	Past	Past	None
MHL8118	Past	Past	None
MHL9236MN	Past	Past	None
MHL9236N	Past	Past	None
MHL9236NN	31-Dec-07	30-Jun-08	None
MHL9318N	Past	Past	None
MHL9838N	Past	Past	None
MHL18336N	Past	Past	None
MHL18926N	Past	Past	None
MHL19338N	Past	Past	None
MHL19338NN	31-Dec-07	30-Jun-08	None
MHL19926N	Past	Past	None
MHL19936N	Past	Past	None
MHL21336N	Past	Past	None
MHL21336NN	31-Dec-07	30-Jun-08	None
MHPA18010N	Past	Past	MHV5IC2215NR2
MHPA19010N	Past	Past	MHV5IC2215NR2
MHPA21010N	Past	Past	MHV5IC2215NR2
MHVIC1905R2	—	—	MW4IC2020GNBR1
MHVIC2115NR2	Past	Past	MHVIC2114NR2, MHV5IC2215NR2
MHW910	Past	Past	MHVIC910HNR2
MHW916	Past	Past	None
MHW1223LA	Past	Past	None
MHW1224	Past	Past	None
MHW1224LA	Past	Past	None
MHW1244N	31-Dec-07	30-Jun-08	None
MHW1253LA	Past	Past	None
MHW1254LAN	31-Dec-07	30-Jun-08	None
MHW1254LN	31-Dec-07	30-Jun-08	None
MHW1303LAN	31-Dec-07	30-Jun-08	None
MHW1304L	Past	Past	None
MHW1304LAN	31-Dec-07	30-Jun-08	None
MHW1345N	31-Dec-07	30-Jun-08	None
MHW1346N	31-Dec-07	30-Jun-08	None
MHW1353LA	Past	Past	None
MHW1354LAN	31-Dec-07	30-Jun-08	None
MHW1810-001	Past	Past	MW4IC2020NBR1
MHW1810-002	Past	Past	MW4IC2020NBR1
MHW1910-001	Past	Past	MW4IC2020NBR1
MHW6342TN	31-Dec-07	30-Jun-08	None
MHW7182B	Past	Past	None
MHW7182CN	31-Dec-07	30-Jun-08	None

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MHW7205C	Past	Past	None
MHW7222A	Past	Past	None
MHW7222BN	31-Dec-07	30-Jun-08	None
MHW7242A	Past	Past	None
MHW7272A	Past	Past	None
MHW7292	Past	Past	None
MHW7292AN	31-Dec-07	30-Jun-08	None
MHW7342	Past	Past	None
MHW8182B	Past	Past	None
MHW8182CN	31-Dec-07	30-Jun-08	None
MHW8185	Past	Past	None
MHW8185L	Past	Past	None
MHW8185LR	Past	Past	None
MHW8185R	Past	Past	None
MHW8188AN	31-Dec-07	30-Jun-08	None
MHW8202B	Past	Past	None
MHW8205	Past	Past	None
MHW8205L	Past	Past	None
MHW8205R	Past	Past	None
MHW8207A	Past	Past	None
MHW8222	Past	Past	None
MHW8222BN	31-Dec-07	30-Jun-08	None
MHW8227AN	31-Dec-07	30-Jun-08	None
MHW8242AN	31-Dec-07	30-Jun-08	None
MHW8247AN	31-Dec-07	30-Jun-08	None
MHW8267AN	31-Dec-07	30-Jun-08	None
MHW8272AN	31-Dec-07	30-Jun-08	None
MHW8292	Past	Past	None
MHW8342N	31-Dec-07	30-Jun-08	None
MHW9146N	31-Dec-07	30-Jun-08	None
MHW9182B	Past	Past	None
MHW9182CN	31-Dec-07	30-Jun-08	None
MHW9186AN	31-Dec-07	30-Jun-08	None
MHW9186N	31-Dec-07	30-Jun-08	None
MHW9187N	31-Dec-07	30-Jun-08	None
MHW9188AN	31-Dec-07	30-Jun-08	None
MHW9188N	31-Dec-07	30-Jun-08	None
MHW9189	Past	Past	None
MHW9189A	Past	Past	None
MHW9189AN	31-Dec-07	30-Jun-08	None
MHW9206N	31-Dec-07	30-Jun-08	None
MHW9207A	Past	Past	None

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MHW9227	Past	Past	None
MHW9227AN	31-Dec-07	30-Jun-08	None
MHW9236N	31-Dec-07	30-Jun-08	None
MHW9242A	Past	Past	None
MHW9247AN	31-Dec-07	30-Jun-08	None
MHW9247N	31-Dec-07	30-Jun-08	None
MHW9267AN	31-Dec-07	30-Jun-08	None
MHW9267N	31-Dec-07	30-Jun-08	None
MHW9276N	31-Dec-07	30-Jun-08	None
MHW10186N	31-Dec-07	30-Jun-08	None
MHW10188AN	31-Dec-07	30-Jun-08	None
MHW10236N	31-Dec-07	30-Jun-08	None
MHW10247AN	31-Dec-07	30-Jun-08	None
MHW10276N	31-Dec-07	30-Jun-08	None
MMG1001NT1	31-Dec-07	30-Jun-08	None
MMG2401NR2	03-Oct-08	14-May-2009	None
MMG5004NR2	—	—	None
MRF182	Past	Past	MWIC930NR1
MRF182LSR1	Past	Past	MRFE6S9045NR1
MRF182R1	Past	Past	MWIC930NR1
MRF182SR1	Past	Past	MRFE6S9045NR1
MRF183	Past	Past	MRFE6S9045NR1
MRF183LSR1	Past	Past	MRFE6S9045NR1
MRF183R1	Past	Past	MRFE6S9045NR1
MRF183S	Past	Past	MRFE6S9045NR1
MRF183SR1	Past	Past	MRFE6S9045NR1
MRF184LSR1	Past	Past	MRFE6S9060NR1
MRF184R1	Past	Past	MRFE6S9060NR1
MRF185	Past	Past	MRFE6S9125NBR1, MRFE6S9130HR3
MRF186	Past	Past	PRFE6P9220H
MRF187	Past	Past	MRFE6S9125NBR1, MRFE6S9130HR3
MRF187S	Past	Past	MRFE6S9125NR1, MRFE6S9130HSR3
MRF187SR3	Past	Past	MRFE6S9125NR1, MRFE6S9130HSR3
MRF284LR1	03-Oct-08	14-May-2009	MRFE6S18060NBR1, MRF5S19060NBR1, MRF6S20010NR1, MRF5S21045NBR1, MRF6S21050LR3
MRF284LSR1	Past	Past	MW5IC2030NBR1, MW4IC2230NBR1
MRF372	Past	Past	PRFE6P9220H
MRF372R3	03-Oct-08	14-May-2009	PRFE6P9220H
MRF372R5	03-Oct-08	14-May-2009	PRFE6P9220H
MRF373	Past	Past	MRFE6S9060NR1
MRF373ALR5	03-Oct-08	14-May-2009	MRFE6S9060NR1
MRF373ALSR5	03-Oct-08	14-May-2009	MRFE6S9060NR1

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF373LSR1	Past	Past	MRFE6S9060NR1
MRF373LSR5	03-Oct-08	14-May-2009	MRFE6S9060NR1
MRF373R1	Past	Past	MRFE6S9060NR1
MRF373S	Past	Past	MRFE6S9060NR1
MRF374	Past	Past	MRFE6S9125NBR1, MRFE6S9130HR3
MRF374A	03-Oct-08	14-May-2009	MRFE6S9060NR1
MRF377	Past	Past	MRF377HR3
MRF377R3	Past	Past	MRF377HR3
MRF377R5	Past	Past	MRF377HR5
MRF1507T1	Past	Past	MRF1511NT1, MRF1517NT1
MRF1946	Past	Past	MRF1535NT1
MRF1946A	Past	Past	MRF1535NT1
MRF6522-060	Past	Past	MRFE6S9060NR1
MRF6522-10R1	Past	Past	MHV5IC2215NR2, MRF6S20010NR1
MRF6522-5R1	Past	Past	MHV5IC2215NR2, MRF6S20010GNR1, MRF9002NR2
MRF6522-70R3	03-Oct-08	14-May-2009	MRFE6S9060NR1
MRF9030LSR1	27-Dec-07	27-Jun-08	MRF9030NR1, MWIC930NR1, MRF9045LSR1, MRFE6S9045NR1
MRF9030NBR1	27-Dec-07	27-Jun-08	MWIC930NR1
MRF9045NBR1	27-Dec-07	27-Jun-08	MRFE6S9045NR1
MRF9060LSR1	03-Oct-08	14-May-2009	MRFE6S9060NR1
MRF9060NBR1	27-Dec-07	27-Jun-08	MRFE6S9060NR1
MRF9080LR3	03-Oct-08	14-May-2009	MRFE6S9060NR1, MRF5S9080NBR1, MRF5S9100NBR1
MRF9080LSR3	Past	Past	MRFE6S9125NR1, MRFE6S9130HSR3
MRF9085LSR3	03-Oct-08	14-May-2009	MRFE6S9060NR1, MRF5S9080NR1, MRF5S9100NR1
MRF9100LR3	Past	Past	MRF5S9100NBR1
MRF9100LSR3	Past	Past	MRF5S9101NR1
MRF9120LR3	03-Oct-08	14-May-2009	MRFE6S9130HR3, PRFE6P9220H
MRF9120S	Past	Past	MRFE6S9125NBR1, MRFE6S9130HR3
MRF9130LR3	Past	Past	MRF6S9130HR3, MRF6S9125NBR1
MRF9130LSR3	Past	Past	MRF6S9130HSR3, MRF6S9125NR1
MRF9135LR3	03-Oct-08	14-May-2009	MRFE6S9135HR3
MRF9180S	Past	Past	PRFE6P9220H, MRFE6S9200HSR3
MRF9200LR3	—	—	MRFE6S9200HR3, MRFE6S9205HR3
MRF9200LSR3	—	—	MRFE6S9200HSR3, MRFE6S9205HSR3
MRF9582NT1	03-Oct-08	14-May-2009	MW6S004NT1
MRF18030ALR3	Past	Past	MW5IC2030NBR1
MRF18030ALSR3	03-Oct-08	14-May-2009	MRF6S18060NR1
MRF18030BLR3	—	—	MW5IC2030NBR1
MRF18030BLSR3	Past	Past	MW5IC2030GNBR1

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Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF18060ALR3	03-Oct-08	14-May-2009	MRF6S18060NBR1, MRF6S18100NBR1, PRF7S18125AH, MRF7S19080HR3
MRF18060ALSR3	Past	Past	MRF6S18060NR1, MRF5S19060NR1, MRF6S19060NR1
MRF18060BLR3	—	—	MRF6S18060NBR1, MRF5S19060NBR1, MRF6S19060NR1
MRF18060BLSR3	Past	Past	MRF6S18060NR1, MRF5S19060NR1, MRF6S19060NR1
MRF18085ALR3	Past	Past	MRF6S18100NBR1, MRF7S19080HR3, MRF6S19100HR3, MRF6S19100NBR1, MRF7S19100NBR1
MRF18085BLR3	Past	Past	MRF6S18100NBR1, MRF7S19080HR3, MRF6S19100HR3, MRF6S19100NBR1, MRF7S19100NBR1
MRF18085BLSR3	Past	Past	MRF7S19080HSR3, MRF6S19100NR1, MRF6S19100HSR3, MRF7S19100NR1
MRF18090AR3	03-Oct-08	14-May-2009	MRF6S18100NBR1, PRF7S18125AH, MRF7S18170HR3, MRF7S19080HR3
MRF18090AS	Past	Past	MRF6S18100NR1, MRF7S19080HSR3, MRF6S19100NR1, MRF5S19130HSR3
MRF18090ASR3	Past	Past	MRF6S18100NR1, MRF6S19100NR1, MRF5S19130HSR3
MRF18090BR3	Past	Past	MRF6S18100NBR1, MRF6S19100NBR1, MRF5S19130HR3
MRF18090BSR3	Past	Past	MRF6S18100NR1, MRF6S19100NR1, MRF5S19130HSR3
MRF19030LSR3	03-Oct-08	14-May-2009	MRF6S19060NR1, MRF6S20010NR1
MRF19045LR3	27-Dec-07	27-Jun-08	MRF6S18060NBR1, MRF5S19060NBR1, MRF6S19060NBR1, MW6IC1940NBR1
MRF19045LSR3	27-Dec-07	27-Jun-08	MRF6S18060NR1, MRF5S19060NR1, MRF6S19060NR1, MW6IC1940GNBR1
MRF19060LR3	Past	Past	MRF6S18060NBR1, MRF5S19060NBR1, MRF6S19060NBR1
MRF19060LSR3	Past	Past	MRF6S18060NR1, MRF5S19060NR1, MRF6S19060NR1
MRF19085LSR3	03-Oct-08	14-May-2009	MRF7S19080HSR3, MRF6S19100HSR3, MRF6S19100NR1, MRF6S19140HSR3
MRF19090R3	—	—	MRF6S18100NBR1, MRF6S19100NBR1
MRF19090SR3	03-Oct-08	14-May-2009	MRF6S19100HSR3, MRF6S19100NR1, MRF7S19080HSR3, MRF6S19140HSR3
MRF19120	—	—	MRF6S19120HR3
MRF19120S	—	—	MRF5S19130HSR3, MRF6S19120HSR3
MRF19125R3	27-Dec-07	27-Jun-08	MRF6S19120HR3, MRF7S19120NBR1, MRF5S19130HR3, MRF6S19140HR3
MRF19125SR3	Past	Past	MRF6S19120HSR3, MRF5S19130HSR3, MRF6S19140HSR3
MRF20030R	Past	Past	MW5IC2030NBR1
MRF20060R	Past	Past	MRF6S19060NBR1
MRF20060RS	Past	Past	MRF6S19060NR1

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF21010LR1	03-Oct-08	14-May-2009	MRF6S20010NR1, MRF5S21045NBR1, MRF6S21050LR3
MRF21030LSR3	Past	Past	MRF5P21045NR1, MRF5S21045NR1, MRF6S21050LSR3, MW5IC2030NBR1, MW4IC2230NBR1, MW6IC2240GNBR1
MRF21060LR3	Past	Past	MRF5S19060NBR1, MRF6S19060NBR1, MRF6S21050LR3, MRF6S21060NBR1
MRF21060LSR3	Past	Past	MRF5S19060NR1, MRF6S19060NR1, MRF6S21050LSR3, MRF6S21060NR1
MRF21085LR3	Past	Past	MRF7S21080HR3, MRF6S21100HR3, MRF6S21100NBR1, MRF7S21110HR3
MRF21085LSR3	27-Dec-07	27-Jun-08	MRF7S21080HSR3, MRF6S21100HSR3, MRF6S21100NR1, MRF7S21110HSR3
MRF21090R3	Past	Past	MRF6S18100NBR1, MRF6S19100NBR1, MRF7S21080HR3, MRF6S21100HR3, MRF6S21100NBR1
MRF21090SR3	Past	Past	MRF6S19100NR1, MRF7S21080HSR3, MRF5S21100HSR3, MRF6S21100NR1
MRF21120R6	—	—	MRF6P21190HR6
MRF21120S	Past	Past	MRF5P21180HR6
MRF21125R3	Past	Past	MRF6S21140HR3
MRF21125SR3	Past	Past	MRF6S21140HSR3
MRF21180R6	Past	Past	MRF5P21180HR6, MRF6P21190HR6
MRF21180S	—	—	MRF5P21180HR6, MRF6P21190HR6
MRF5P20180HR6	Past	Past	MRF5P21180HR6, MRF7S19170HR3
MRF5P20180R6	Past	Past	MRF5P21180HR6, MRF6P21190HR6
MRF5P21180R6	Past	Past	MRF5P21180HR6
MRF5P21240HR6	27-Dec-07	27-Jun-08	MRF6P21190HR6
MRF5P21240R6	Past	Past	MRF6P21190HR6
MRF5S4140HR3	03-Oct-08	14-May-2009	MRF6V2150NBR1, MRF5S4125NBR1
MRF5S4140HSR3	03-Oct-08	14-May-2009	MRF6V2150NR1, MRF5S4125NR1
MRF5S9150HR3	03-Oct-08	14-May-2009	MRFE6S9130HR3, MRF5S9150HSR3, MRFE6S9160HR3, MRFE6S9201HR3
MRF5S19090HR3	Past	Past	MRF6S19100HR3, MRF6S19100NBR1, MRF7S19100NBR1
MRF5S19090HSR3	27-Dec-07	27-Jun-08	MRF6S19100HSR3, MRF6S19120HSR3, MRF7S19100NR1
MRF5S19090LR3	Past	Past	MRF6S19100HR3, MRF6S19100NBR1, MRF7S19100NBR1
MRF5S19090LSR3	Past	Past	MRF6S19100HSR3, MRF6S19100NR1, MRF7S19100NR1
MRF5S19100HR3	27-Dec-07	27-Jun-08	MRF6S19100HR3, MRF6S19120HR3, MRF7S19100NBR1
MRF5S19100HSR3	03-Oct-08	14-May-2009	MRF6S19100NR1, MRF7S19100NR1, MRF6S19120HSR3
MRF5S19100LR3	Past	Past	MRF6S19100HR3, MRF6S19100NBR1, MRF7S19100NBR1

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF5S19100LSR3	Past	Past	MRF6S19100HSR3, MRF6S19100NR1, MRF7S19100NR1
MRF5S19130HR3	03-Oct-08	14-May-2009	MRF5S19130HSR3, MRF6S19140HR3, MRF7S19170HR3
MRF5S19130R3	Past	Past	MRF5S19130HR3, MRF6S19140HR3, MRF7S19170HR3
MRF5S19130SR3	Past	Past	MRF5S19130HSR3, MRF6S19140HSR3, MRF7S19170HSR3
MRF5S19150HSR3	27-Dec-07	27-Jun-08	MRF6S19140HSR3, MRF7S19170HSR3
MRF5S19150R3	Past	Past	MRF5S19150HR3, MRF6S19140HR3, MRF7S19170HR3
MRF5S19150SR3	Past	Past	MRF6S19140HSR3, MRF7S19170HSR3
MRF5S21090HR3	03-Oct-08	14-May-2009	MRF6S21100HR3, MRF6S21100NBR1, MRF7S21110HR3
MRF5S21090HSR3	03-Oct-08	14-May-2009	MRF6S21100HSR3, MRF6S21100NR1, MRF7S21110HSR3
MRF5S21090LR3	Past	Past	MRF6S21100HR3, MRF6S21100NBR1, MRF7S21110HR3
MRF5S21090LSR3	Past	Past	MRF6S21140HSR3
MRF5S21100HR3	03-Oct-08	14-May-2009	MRF6S21100HR3, MRF6S21100NBR1, MRF7S21110HR3
MRF5S21100HSR3	27-Dec-07	27-Jun-08	MRF6S21100HSR3, MRF6S21100NR1, MRF7S21110HSR3
MRF5S21100LR3	Past	Past	MRF6S21100HR3, MRF6S21100NBR1, MRF7S21110HR3
MRF5S21100LSR3	Past	Past	MRF6S21100HSR3, MRF6S21100NR1
MRF5S21130HR3	03-Oct-08	14-May-2009	MRF7S21110HR3, MRF6S21140HR3, MRF7S21150HR3, MRF7S21170HR3
MRF5S21130HSR3	03-Oct-08	14-May-2009	MRF7S21110HSR3, MRF6S21140HSR3, MRF7S21150HSR3, MRF7S21170HSR3
MRF5S21130R3	Past	Past	MRF6S21140HR3, MRF7S21150HR3
MRF5S21130SR3	Past	Past	MRF6S21140HSR3, MRF7S21150HSR3
MRF5S21150HR3	Past	Past	MRF6S21140HR3, MRF7S21170HR3
MRF5S21150HSR3	Past	Past	MRF6S21140HSR3, MRF7S21170HSR3
MRF5S21150R3	Past	Past	MRF6S21140HR3, MRF7S21170HR3
MRF5S21150SR3	Past	Past	MRF6S21140HSR3, MRF7S21170HSR3
MRF6P3300HR3	3-Apr-08	1-Oct-08	MRFE6P3300HR3
MRF6P9220HR3	3-Apr-08	1-Oct-08	PRFE6P9220H
MRF6S9045NBR1	3-Apr-08	1-Oct-08	MRFE6S9045NR1
MRF6S9045NR1	3-Apr-08	1-Oct-08	MRFE6S9045NR1
MRF6S9060NBR1	3-Apr-08	1-Oct-08	MRFE6S9060NR1
MRF6S9060NR1	3-Apr-08	1-Oct-08	MRFE6S9060NR1
MRF6S9125NBR1	3-Apr-08	1-Oct-08	MRFE6S9125NBR1
MRF6S9125NR1	3-Apr-08	1-Oct-08	MRFE6S9125NR1
MRF6S9130HR3	3-Apr-08	1-Oct-08	MRFE6S9130HR3
MRF6S9130HR5	3-Apr-08	1-Oct-08	MRFE6S9130HR5

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Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF6S9130HSR3	3-Apr-08	1-Oct-08	MRFE6S9130HSR3
MRF6S9160HR3	3-Apr-08	1-Oct-08	MRFE6S9160HR3
MRF6S9160HSR3	3-Apr-08	1-Oct-08	MRFE6S9160HSR3
MRFG35002N6T1	Past	Past	MRFG35002N6AT1
MRFG35003N6T1	Past	Past	MRFG35003N6AT1
MRFG35003NT1	Past	Past	MRFG35003ANT1
MRFG35005NT1	Past	Past	MRFG35005ANT1
MRFG35010NT1	Past	Past	MRFG35010ANT1
MRFG35010R1	Past	Past	MRFG35010AR1
MW4IC001NR4	27-Dec-07	27-Jun-08	MW6S004NT1

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