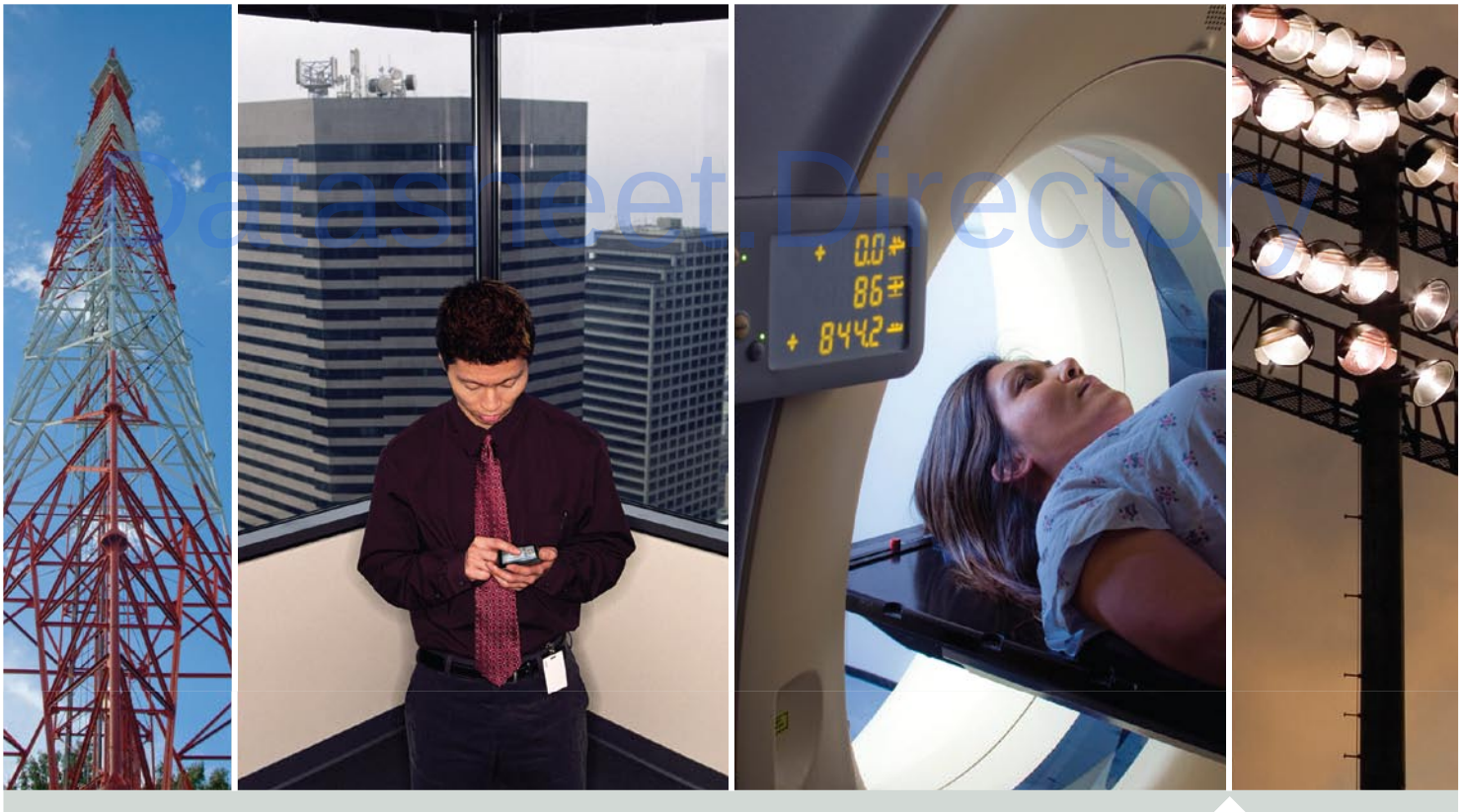
RF Products

Freescale Semiconductor
Selector Guide



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RF Product Selector Guide

Freescale Semiconductor offers a comprehensive portfolio of RF products, primarily serving the cellular infrastructure, general purpose amplifier, broadcast, aerospace and industrial markets. Freescale pioneered RF technology and continues to be the leader in the field by providing the highest levels of device quality, reliability and consistency. Our products enable developers to create cost-effective, high-performance, innovative designs. Freescale supports these developers through unequaled integration, ease of use, the most comprehensive RF toolkit in the industry and global technical support. 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 broadband data, WiMAX, broadcast, mobile radio and various industrial and commercial aerospace applications.

How to Use This Selector Guide

RF Low Power Amplifiers, LDMOS Power Transistors, GaAs Power Transistors, Power Amplifier ICs 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 generation of LDMOS where applicable.

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 Power Design Resources at http://www.freescale.com/rfpower for specific RF Product support information for:

- Data sheets
- Applications notes
- Selector guides
- Packaging information
- Application information
- Models
- MTTF Calculators
- .s2p Files
- Press releases
- Events
- RF Power Selector

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 FET^2, MET and Root models. All product models available in the RF High Power Model Library (FET^2, MET and Root) include package, bond wire and internal matching network effects.

The FET^2 and MET models for RF High Power transistors and RF ICs are nonlinear models that examine both electrical and thermal phenomena and can account for dynamic self-heating effects of device performance. They are 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 and AWR Microwave Office®, the FET^2 and MET models are capable of performing small-signal, large-signal, harmonic-balance, noise and transient simulations. Because of their ability to simulate self-heating effects, the FET^2 and MET models are more accurate than existing models, enabling circuit designers to predict prototype performance more accurately and reduce design cycle time.

The current release of the FET^2 and MET models are available for these tools:

- Agilent EEsof ADS nonlinear circuit simulator
- AWR Microwave Office

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 at a cost. The U.S. Literature Center has multiple credit card options as an available form of payment.

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RF Low Power

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RF Low Power

Low Noise Amplifiers

Product	RF Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Standby Current μA (Typ)	Small Signal Gain dB (Typ)	Output IP3 dBm (Typ)	NF dB (Typ)	Packaging	System Applicability
MBC13720NT1[18c]	400 to 2400	2.3 to 3.0	5.11	<1	14 @ 1900 MHz	20 @ 1900 MHz	1.38 @ 1900 MHz	419B/ SOT-363	VCOs, Mixers, ISM, GPS, Cellular, WLAN, RKE, Low Power Amp
MBC13916NT1[18c]	100 to 2500	2.7 to 5.0	4.7	—	19 @ 900 MHz	13 @ 900 MHz	1.25 @ 900 MHz	1404/ SOT-343R	General Purpose Cascode Amp for VCOs, Buffer Amps, RKE, GPS, Gain Blocks
MC13821[18b]	800 to 2500	2.7 to 3.0	2.8	<1	18 @ 1575 MHz	18.5 @ 1575 MHz	1.2 @ 1575 MHz	1345/ QFN-12	Buffer Amps, Mixers, VCOs, Cellular, GPS, WLAN
MC13853FC[18b]	Band V, VI 880 Band VIII 950 Band III 1850 Band II 1960 Band I 2140	2.7 to 3.0 2.7 to 3.0 2.7 to 3.0 2.7 to 3.0 2.7 to 3.0	8.6 8.6 7.8 7.8 6	<1	13.5 12 13.5 13.5 15	11 9.5 11 11 12.5	1.4 1.45 1.55 1.55 1.55	1919/ QFN-16	W-CDMA Cellular

[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 Low Power Packages

CASE 419B
(SOT-363)

CASE 1345
(QFN-12)

CASE 1404
(SOT-343R)

SCALE 1:1

RF Transistors

Freescale Semiconductor continues to be the industry leader in RF transistor technology. With recent extensions of the RF transistor portfolio, Freescale now provides power amplifier products for cellular infrastructure, mobile radio, commercial aerospace, industrial, scientific and medical (ISM), VHF/UHF broadcast, and general purpose 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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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 mobile radio, digital television broadcast, GSM, GSM/EDGE, CDMA, W-CDMA and LTE. The high gain and excellent linear performance of these devices is suitable for any application, including advanced digital modulations and pulsed applications with high signal peak-to-average ratios.

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	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	0.50	1264/1 (TO-272-6 Wrap)
MRF1550FNT1[18j]	U	135-175	50 CW	1-Tone	12.5	14.5/175	55	0.50	1264A/1 (TO-272-6)
MRF1570NT1[18j]	U	400-470	70 CW	1-Tone	12.5	11.5/470	60	0.29	1366/1 (TO-272-8 Wrap)
MRF1570FNT1[18j]	U	400-470	70 CW	1-Tone	12.5	11.5/470	60	0.29	1366A/1 (TO-272-8)

Table 2. HF/VHF - To 600 MHz

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
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)
MRF6V4300NR1[18a]	U	10-600	300 CW	1-Tone	50	22/450	60	0.24	1486/1 (TO-270 WB-4)
MRF6V4300NBR1[18a]	U	10-600	300 CW	1-Tone	50	22/450	60	0.24	1484/1 (TO-272 WB-4)
MRF6VP2600HR6[18o]	U	2-500	125 AVG	OFDM	50	25/225	28.5	0.20	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.

RF LDMOS Power Transistors (continued)

Table 3. Broadcast – To 1000 MHz

Product	Frequency Band [37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	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	1.1	1265/1 (TO–270–2)
MRFE6S9060NR1[18a]	U	880	14 AVG	N–CDMA	28	21.4/880	32.1	0.88	1265/1 (TO–270–2)
MRF6V3090NR1[18a]★	I	470–860	18 AVG	OFDM	50	22/860	28.5	0.79	1486/1 (TO–270 WB–4)
MRF6V3090NR5[18p]★	I	470–860	18 AVG	OFDM	50	22/860	28.5	0.79	1486/1 (TO–270 WB–4)
MRF6V3090NBR1[18a]★	I	470–860	18 AVG	OFDM	50	22/860	28.5	0.79	1484/1 (TO–272 WB–4)
MRF6V3090NBR5[18p]★	I	470–860	18 AVG	OFDM	50	22/860	28.5	0.79	1484/1 (TO–272 WB–4)
MRFE6P3300HR3[18j]	I/O	470–860	270 PEP	2–Tone	32	20.4/860	44.8	0.23	375G/1 (NI–860C)
MRF6VP3450HR6[18o]	I	470–860	90 AVG	OFDM	50	22.5/860	28	0.27	375D/1 (NI–1230)
MRF6VP3450HR5[18p]	I	470–860	90 AVG	OFDM	50	22.5/860	28	0.27	375D/1 (NI–1230)
MRF6VP3450HSR6[18o]	I	470–860	90 AVG	OFDM	50	22.5/860	28	0.27	375E/1 (NI–1230S)
MRF6VP3450HSR5[18p]	I	470–860	90 AVG	OFDM	50	22.5/860	28	0.27	375E/1 (NI–1230S)

Table 4. Cellular – To 800 MHz

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
700 – 800 MHz, Class AB									
MW6S004NT1[18f]	U	1–2000	4 PEP	2–Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW7IC008NT1[18f]★	I/O	100–1000	6.5 CW	1–Tone	28	23.5/900	34	3.2	1894 (PQFN 8x8)
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)
MRF8P9040N[46a]	I	700–1000	4 AVG	W–CDMA	28	19.9/960	19.2	1.5	1486/1 (TO–270 WB–4)
MRF8P9040NB[46a]	I	700–1000	4 AVG	W–CDMA	28	19.9/960	19.2	1.5	1484/1 (TO–272 WB–4)
MRF8S7120NR3[18i]★	I/O	728–768	32 AVG	W–CDMA	28	19.2/768	38.1	0.65	2021/1 (OM–780–2)
MRF8S7170NR3[18i]★	I/O	728–768	50 AVG	W–CDMA	28	19.5/748	37	0.37	2021/1 (OM–780–2)

Table 5. Cellular – To 1000 MHz

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
800 – 1000 MHz, Class AB									
MW6S004NT1[18f]	U	1–2000	4 PEP	2–Tone	28	18/1960	33	8.8	466/1 (PLD 1.5)
MW7IC008NT1[18f]★	I/O	100–1000	6.5 CW	1–Tone	28	23.5/900	34	3.2	1894 (PQFN 8x8)
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)
MRF8P9040N[46a]	I	700–1000	4 AVG	W–CDMA	28	19.9/960	19.2	1.5	1486/1 (TO–270 WB–4)
MRF8P9040NB[46a]	I	700–1000	4 AVG	W–CDMA	28	19.9/960	19.2	1.5	1484/1 (TO–272 WB–4)
MRFE6S9045NR1[18a]	U	865–895	10 AVG	N–CDMA	28	22.1/880	32	1.1	1265/1 (TO–270–2)
MRFE6S8046NR1[18a]★	I/O	864–894	35.5 CW	1–Tone	28	19.8/894	57.7	1.7	1486/1 (TO–270 WB–4)
MRFE6S8046GNR1[18a]★	I/O	864–894	35.5 CW	1–Tone	28	19.8/894	57.7	1.7	1487/1 (TO–270 WB–4 Gull)
MRFE6S9046NR1[18a]★	I/O	920–960	35.5 CW	1–Tone	28	19/960	57	1.3	1486/1 (TO–270 WB–4)
MRFE6S9046GNR1[18a]★	I/O	920–960	35.5 CW	1–Tone	28	19/960	57	1.3	1487/1 (TO–270 WB–4 Gull)
MRFE6S9060NR1[18a]	U	865–895	14 AVG	N–CDMA	28	21.4/880	32.1	0.88	1265/1 (TO–270–2)

[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) 2Q10; b) 3Q10.

★New Product

RF LDMOS Power Transistors (continued)

Table 5. Cellular – To 1000 MHz (continued)

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
800 – 1000 MHz, Class AB (continued)									
MRF5S9070NR1[18a]	U	800–900	14 AVG	N-CDMA	26	17.8/880	30	0.93	1265/1 (TO-270-2)
MW5IC970NBR1[18a]	I	800–900	70 PEP	2-Tone	28	30/870	48	0.8	1329/- (TO-272 WB-16)
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	865–960	20 AVG	N-CDMA	26	19.5/880	28	0.52	1486/1 (TO-270 WB-4)
MRF8S9100HR3[18i]★	I	920–960	72 CW	1-Tone	28	19.3/920	51.6	0.65	465/1 (NI-780)
MRF8S9100HSR3[18i]★	I	920–960	72 CW	1-Tone	28	19.3/920	51.6	0.65	465A/1 (NI-780S)
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	865–895	27 AVG	N-CDMA	28	20.2/880	31	0.45	1486/1 (TO-270 WB-4)
MRFE6S9125NBR1[18a]	I	865–895	27 AVG	N-CDMA	28	20.2/880	31	0.45	1484/1 (TO-272 WB-4)
MRFE6S9130HR3[18i]	I	865–960	27 AVG	N-CDMA	28	19.2/880	30.5	0.51	465/1 (NI-780)
MRFE6S9135HSR3[18i]	I/O	920–960	39 AVG	W-CDMA	28	21/940	32.3	0.48	465C/1 (NI-880S)
MRFE6S9160HSR3[18i]	I	865–960	35 AVG	N-CDMA	28	21/880	31	0.33	465A/1 (NI-780S)
MRF8S9170NR3[18i]★	I/O	920–960	50 AVG	W-CDMA	28	19.3/920	36.5	0.38	2021/1 (OM-780-2)
MRFE6S9200HR3[18i]	I	865–895	58 AVG	W-CDMA	28	21/880	35	0.33	465B/1 (NI-880)
MRF8S9200NR3[18i]★	I/O	920–960	58 AVG	W-CDMA	28	19.9/940	37.1	0.30	2021/- (OM780-2)
MRFE6S9201HR3[18i]	I	865–895	40 AVG	N-CDMA	28	20.8/880	31.3	0.30	465/1 (NI-780)
MRFE6S9201HSR3[18i]	I	865–895	40 AVG	N-CDMA	28	20.8/880	31.3	0.30	465A/1 (NI-780S)
MRFE6S9205HSR3[18i]	I/O	865–895	58 AVG	W-CDMA	28	21.2/880	34	0.33	465C/1 (NI-880S)
MRFE6P9220HR3[18i]	I/O	865–900	47 AVG	N-CDMA	28	20/880	30	0.28	375G/1 (NI-860C3)
MRF8S9220HR3[18i]★	I/O	920–960	65 AVG	W-CDMA	28	19.4/960	35.7	0.39	465/1 (NI-780)
MRF8S9220HSR3[18i]★	I/O	920–960	65 AVG	W-CDMA	28	19.4/960	35.7	0.39	465A/1 (NI-780S)
MRF8S9260HR3[18i]★	I/O	920–960	75 AVG	W-CDMA	28	18.6/960	38.5	0.37	465B/1 (NI-880)
MRF8S9260HSR3[18i]★	I/O	920–960	75 AVG	W-CDMA	28	18.6/960	38.5	0.37	465C/1 (NI-880S)
MRF8P9300HR6[18o]★	I/O	920–960	100 AVG	W-CDMA	28	19.4/960	35.8	0.22	375D/1 (NI-1230)
MRF8P9300HSR6[18o]★	I/O	920–960	100 AVG	W-CDMA	28	19.4/960	35.8	0.22	375E/1 (NI-1230S)

Table 6. Cellular – To 1500 MHz

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
1470 – 1510 MHz, Class AB									
MRF7S15100HR3[18i]	I/O	1470–1510	23 AVG	W-CDMA	28	19.5/1510	32	0.74	465/1 (NI-780)
MRF7S15100HSR3[18i]	I/O	1470–1510	23 AVG	W-CDMA	28	19.5/1510	32	0.74	465A/1 (NI-780S)

Table 7. General Purpose LDMOS Drivers

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	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)
MW7IC008NT1[18f]★	I/O	100–1000	6.5 CW	1-Tone	28	23.5/900	34	3.2	1894 (PQFN 8x8)
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)

[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

Table 8. Cellular – To 2200 MHz

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
1800 – 2000 MHz, Class AB									
MRF6S20010NR1[18a]	I	1805–1990	4 AVG	1–Tone	28	16/1805,1880	33	2.5	1265/1 (TO–270–2)
MRF6S20010GNR1[18a]	I	1805–1990	4 AVG	1–Tone	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)
MRF8S18120HR3[18i]★	I/O	1805–1880	72 CW	1–Tone	28	18.2/1805	49.8	0.47	465/1 (NI–780)
MRF8S18120HSR3[18i]★	I/O	1805–1880	72 CW	1–Tone	28	18.2/1805	49.8	0.47	465A/1 (NI–780S)
MRF7S18125AHR3[18i]	I/O	1805–1880	125 CW	1–Tone	28	17/1880	55	0.31	465/1 (NI–780)
MRF7S18125AHSR3[18i]	I/O	1805–1880	125 CW	1–Tone	28	17/1880	55	0.31	465A/1 (NI–780S)
MRF7S18125BHR3[18i]	I/O	1930–1990	125 CW	1–Tone	28	16.5/1930	55	0.31	465/1 (NI–780)
MRF7S18125BHSR3[18i]	I/O	1930–1990	125 CW	1–Tone	28	16.5/1930	55	0.31	465A/1 (NI–780S)
MRF7S18170HR3[18i]	I/O	1805–1880	50 AVG	W–CDMA	28	17.5/1880	31	0.30	465B/1 (NI–880)
MRF7S18170HSR3[18i]	I/O	1805–1880	50 AVG	W–CDMA	28	17.5/1805	31	0.30	465C/1 (NI–880S)
MRF8P18265H[46b]	I/O	1805–1880	72 AVG	W–CDMA	30	16/1840	43.7	—	375I/1 (NI–1230–8)
MRF8P18265HS[46b]	I/O	1805–1880	72 AVG	W–CDMA	30	16/1840	43.7	—	375J/1 (NI–1230S–8)
MRF8P20160H[46a]	I/O	1880–2025	37 AVG	W–CDMA	28	16.5/1920	45.8	0.95	465M/1 (NI–780–4)
MRF8P20160HSR3[18i]★	I/O	1880–2025	37 AVG	W–CDMA	28	16.5/1920	45.8	0.95	465H/1 (NI–780S–4)
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)
MRF7S19080HR3[18i]	I/O	1930–1990	24 AVG	W–CDMA	28	18/1990	32	0.69	465/1 (NI–780)
MRF7S19080HSR3[18i]	I/O	1930–1990	24 AVG	W–CDMA	28	18/1990	32	0.69	465A/1 (NI–780S)
MRF6S19100HR3[18i]	I/O	1930–1990	22 AVG	N–CDMA	28	16.1/1990	28	0.50	465/1 (NI–780)
MRF7S19100NR1[18a]	I/O	1930–1990	29 AVG	W–CDMA	28	17.5/1990	30	0.68	1486/1 (TO–270 WB–4)
MRF7S19100NBR1[18a]	I/O	1930–1990	29 AVG	W–CDMA	28	17.5/1990	30	0.68	1484/1 (TO–272 WB–4)
MRF7S19120NR1[18a]	I/O	1930–1990	36 AVG	W–CDMA	28	18/1990	32	0.51	1730 (TO–270 WBL–4)
MD7P19130HR3[18i]	I/O	1930–1990	40 AVG	W–CDMA	28	20/1990	30	0.36	465M/1 (NI–780–4)
MD7P19130HSR3[18i]	I/O	1930–1990	40 AVG	W–CDMA	28	20/1990	30	0.36	465H/1 (NI–780S–4)
MRF6S19140HSR3[18i]	I/O	1930–1990	29 AVG	N–CDMA	28	16/1990	27.5	0.38	465C/1 (NI–880S)
MRF8S19140HR3[18i]★	I/O	1930–1990	34 AVG	W–CDMA	28	19.1/1960	31.4	0.48	465/1 (NI–780)
MRF8S19140HSR3[18i]★	I/O	1930–1990	34 AVG	W–CDMA	28	19.1/1960	31.4	0.48	465A/1 (NI–780S)
MRF7S19170HR3[18i]	I/O	1930–1990	50 AVG	W–CDMA	28	17.2/1990	32	0.31	465B/1 (NI–880)
MRF7S19170HSR3[18i]	I/O	1930–1990	50 AVG	W–CDMA	28	17.2/1990	32	0.31	465C/1 (NI–880S)
MRF6S19200HR3[18i]	I/O	1930–1990	56 AVG	W–CDMA	28	17.9/1990	29.5	0.36	465/1 (NI–780)
MRF7S19210HR3[18i]	I/O	1930–1990	63 AVG	W–CDMA	28	20/1990	29	0.38	465/1 (NI–780)
MRF7S19210HSR3[18i]	I/O	1930–1990	63 AVG	W–CDMA	28	20/1990	29	0.38	465A/1 (NI–780S)
2200 MHz, Class AB									
MRF7P20040HR3[18i]	I/O	2010–2025	10 AVG	W–CDMA	32	18.2/2025	42.6	2.5	465M/1 (NI–780–4)
MRF7P20040HSR3[18i]	I/O	2010–2025	10 AVG	W–CDMA	32	18.2/2025	42.6	2.5	465H/1 (NI–780S–4)
MRF8P20100HR3[18i]★	I/O	1805–2025	20 AVG	W–CDMA	28	16/2025	44.3	0.88	465M/1 (NI–780–4)
MRF8P20100HSR3[18i]★	I/O	1805–2025	20 AVG	W–CDMA	28	16/2025	44.3	0.88	465H/1 (NI–780S–4)
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	14.5/2110	25.5	1.48	1486/1 (TO–270 WB–4)
MRF6S21050LR3[18i]	I/O	2110–2170	11.5 AVG	W–CDMA	28	16/2170	27.7	1.28	465E/1 (NI–400)
MRF6S21050LSR3[18i]	I/O	2110–2170	11.5 AVG	W–CDMA	28	16/2170	27.7	1.28	465F/1 (NI–400S)

[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) 2Q10; b) 3Q10.

★New Product

Table 8. Cellular – To 2200 MHz (continued)

Product	Frequency Band[37] MHz		P_{out} (Typ) Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
2200 MHz, Class AB (continued)									
MRF7S21080HR3[18i]	I/O	2110–2170	22 AVG	W-CDMA	28	18/2170	32	0.65	465/1 (NI-780)
MRF7S21080HSR3[18i]	I/O	2110–2170	22 AVG	W-CDMA	28	18/2170	32	0.65	465A/1 (NI-780S)
MRF6S21100HR3[18i]	I/O	2110–2170	23 AVG	W-CDMA	28	15.9/2170	27.6	0.52	465/1 (NI-780)
MRF8S21100H[9]	I/O	2110–2170	24 AVG	W-CDMA	28	34.5/2140	6.6	—	465/1 (NI-780)
MRF8S21100HS[9]	I/O	2110–2170	24 AVG	W-CDMA	28	34.5/2140	6.6	—	465A/1 (NI-780S)
MRF7S21110HR3[18i]	I/O	2110–2170	33 AVG	W-CDMA	28	17.3/2170	32.5	0.41	465/1 (NI-780)
MRF7S21110HSR3[18i]	I/O	2110–2170	33 AVG	W-CDMA	28	17.3/2170	32.5	0.41	465A/1 (NI-780S)
MRF8S21120H[46a]	I/O	2110–2170	28 AVG	W-CDMA	28	17.6/2170	34	0.53	465/1 (NI-780)
MRF8S21120HS[46a]	I/O	2110–2170	28 AVG	W-CDMA	28	17.6/2170	34	0.53	465A/1 (NI-780S)
MRF6S21140HR3[18i]	I/O	2110–2170	30 AVG	W-CDMA	28	15.5/2110	27.5	0.38	465B/1 (NI-880)
MRF6S21140HSR3[18i]	I/O	2110–2170	30 AVG	W-CDMA	28	15.5/2110	27.5	0.38	465C/1 (NI-880S)
MRF8S21140HR3[18i]★	I/O	2110–2170	34 AVG	W-CDMA	28	17.9/2140	31.7	0.47	465/1 (NI-780)
MRF8S21140HSR3[18i]★	I/O	2110–2170	34 AVG	W-CDMA	28	17.9/2140	31.7	0.47	465A/1 (NI-780S)
MRF7S21150HR3[18i]	I/O	2110–2170	44 AVG	W-CDMA	28	17.5/2110	31	0.37	465/1 (NI-780)
MRF7S21150HSR3[18i]	I/O	2110–2170	44 AVG	W-CDMA	28	17.5/2110	31	0.37	465A/1 (NI-780S)
MRF7S21170HR3[18i]	I/O	2110–2170	50 AVG	W-CDMA	28	16/2170	31	0.36	465B/1 (NI-880)
MRF7S21170HSR3[18i]	I/O	2110–2170	50 AVG	W-CDMA	28	16/2170	31	0.36	465C/1 (NI-880S)
MRF5P21180HR6[18o]	I/O	2110–2170	38 AVG	W-CDMA	28	14/2170	25.5	0.33	375D/1 (NI-1230)
MRF6S21190HSR3[18i]	I/O	2110–2170	54 AVG	W-CDMA	28	16/2170	29	0.30	465C/1 (NI-880S)
MRF8S21200HR6[18o]★	I/O	2110–2170	48 AVG	W-CDMA	28	18.1/2140	32.6	0.31	375D/1 (NI-1230)
MRF8S21200HSR6[18o]★	I/O	2110–2170	48 AVG	W-CDMA	28	18.1/2140	32.6	0.31	375E/1 (NI-1230S)
MRF7S21210HR3[18i]	I/O	2110–2170	63 AVG	W-CDMA	28	18.5/2170	29	0.37	465/1 (NI-780)
MRF7S21210HSR3[18i]	I/O	2110–2170	63 AVG	W-CDMA	28	18.5/2170	29	0.37	465A/1 (NI-780S)

Table 9. ISM Band – 2450 MHz

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
MW7IC2425NR1[18a]	I/O	2450	25 CW	1-Tone	28	27.7/2450	43.8	1.2	1886/- (TO-270 WB-16)
MW7IC2425GNR1[18a]	I/O	2450	25 CW	1-Tone	28	27.7/2450	43.8	1.2	1887/- (TO-270 WB-16 Gull)
MW7IC2425NBR1[18a]	I/O	2450	25 CW	1-Tone	28	27.7/2450	43.8	1.2	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)

[9]Product under development.

[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) 2Q10; b) 3Q10.

★New Product

Table 10. L-Band - 960-1400 MHz

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
MRF6V10010NR4[18n]	I/O	960-1400	10 Peak	Pulsed	50	25/1090	69	1.6	466/1 (PLD-1.5)
MRF6V12250HR3[18i]★	I/O	960-1215	275 Peak	Pulsed	50	20.3/1030	65.5	0.08	465/1 (NI-780)
MRF6V12250HSR3[18i]★	I/O	960-1215	275 Peak	Pulsed	50	20.3/1030	65.5	0.08	465A/1 (NI-780S)
MRF6V14300HR3[18i]	I/O	1200-1400	330 Peak	Pulsed	50	18/1400	60.5	0.13	465/1 (NI-780)
MRF6V14300HSR3[18i]	I/O	1200-1400	330 Peak	Pulsed	50	18/1400	60.5	0.13	465A/1 (NI-780S)
MRF6V12500HR3[18i]★	I/O	965-1215	500 Peak	Pulsed	50	19.7/1400	62	0.044	465/1 (NI-780)
MRF6V12500HSR3[18i]★	I/O	965-1215	500 Peak	Pulsed	50	19.7/1400	62	0.044	465A/1 (NI-780S)
MRF6VP121KHR6[18o]★	I/O	965-1215	1000 Peak	Pulsed	50	20/1030	56	0.02	375D/1 (NI-1230)
MRF6VP121KHSR6[18o]★	I/O	965-1215	1000 Peak	Pulsed	50	20/1030	56	0.02	375E/1 (NI-1230S)

Table 11. S-Band - 3100-3500 MHz

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
MRF7S35015HSR3[18i]	I/O	3100-3500	15 Peak	Pulsed	32	16/3500	41	0.60	465J/1 (NI-400S-240)
MRF7S35120HSR3[18i]	I/O	3100-3500	120 Peak	Pulsed	32	12/3500	40	0.11	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.

★New Product

RF WiMAX, WiBro, BWA Power Transistors

With the ongoing deployment of WiMAX systems, device performance demands continue to rise to a new level, requiring exceptional linearity and efficiency. To meet these requirements, Freescale has developed a full portfolio of RF power devices. Current products support the 1.5, 1.6, 2.3, 2.5 and 3.5 GHz bands.

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	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	0.37	465/1 (NI–780)
MRF7S16150HSR3[18i]	I/O	1600–1660	32 AVG	WiMAX	28	19.7/1660	25.4	0.37	465A/1 (NI–780S)
2300–2400 MHz, Class AB									
MRF6S27015NR1[18a]	I	2300–2700	3 AVG	W–CDMA	28	14/2600	22	2.2	1265/1 (TO–270–2)
MRF6S27015GNR1[18a]	I	2300–2700	3 AVG	W–CDMA	28	14/2600	22	2.2	1265A/1 (TO–270–2 Gull)
MW7IC2725NR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1886/– (TO–270 WB–16)
MW7IC2725GNR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1887/– (TO–270 WB–16 Gull)
MW7IC2725NBR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1329/– (TO–272 WB–16)
MRF8P23080HR3[18i]★	I/O	2300–2400	16 AVG	W–CDMA	28	14.6/2300	42	0.91	465M/1 (NI–780–4)
MRF8P23080HSR3[18i]★	I/O	2300–2400	16 AVG	W–CDMA	28	14.6/2300	42	0.91	465H/1 (NI–780S–4)
MRF6S23100HR3[18i]	I/O	2300–2400	20 AVG	W–CDMA	28	15.4/2400	23.5	0.59	465/1 (NI–780)
MRF6S23100HSR3[18i]	I/O	2300–2400	20 AVG	W–CDMA	28	15.4/2400	23.5	0.59	465A/1 (NI–780S)
MRF6S23140HR3[18i]	I/O	2300–2400	28 AVG	W–CDMA	28	15.2/2400	25	0.33	465B/1 (NI–880)
MRF6S23140HSR3[18i]	I/O	2300–2400	28 AVG	W–CDMA	28	15.2/2400	25	0.33	465C/1 (NI–880S)
MRF6P23190HR6[18o]	I/O	2300–2400	40 AVG	W–CDMA	28	14/2400	23.5	0.24	375D/1 (NI–1230)
2600–2700 MHz, Class AB									
MRF6S27015NR1[18a]	I	2300–2700	3 AVG	W–CDMA	28	14/2700	22	2.2	1265/1 (TO–270–2)
MRF6S27015GNR1[18a]	I	2300–2700	3 AVG	W–CDMA	28	14/2700	22	2.2	1265A/1 (TO–270–2 Gull)
MW7IC2725NR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1886/– (TO–270 WB–16)
MW7IC2725GNR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1887/– (TO–270 WB–16 Gull)
MW7IC2725NBR1[18a]	I/O	2300–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1329/– (TO–272 WB–16)
MD7IC2755NR1[18a]	I/O	2500–2700	10 AVG	WiMAX	28	25/2700	25	2.05	1618/– (TO–270 WB–14)
MD7IC2755GNR1[18a]	I/O	2500–2700	10 AVG	WiMAX	28	25/2700	25	2.05	1621/– (TO–270 WB–14 Gull)
MRF8S26060HR3[18i]★	I/O	2620–2690	15.5 AVG	W–CDMA	28	16.3/2690	32.9	1.0	465I/1 (NI–400–240)
MRF8S26060HSR3[18i]★	I/O	2620–2690	15.5 AVG	W–CDMA	28	16.3/2690	32.9	1.0	465J/1 (NI–400S–240)
MRF8S26120H[46b]	I/O	2620–2690	28 AVG	W–CDMA	28	15.6/2690	30.7	—	465/1 (NI–780)
MRF8S26120HS[46b]	I/O	2620–2690	28 AVG	W–CDMA	28	15.6/2690	30.7	—	465A/1 (NI–780S)
MRF6S27050HR3[18i]	I/O	2500–2700	7 AVG	W–CDMA	28	16/2700	22.5	0.98	465/1 (NI–780)
MRF6S27050HSR3[18i]	I/O	2500–2700	7 AVG	W–CDMA	28	16/2700	22.5	0.98	465A/1 (NI–780S)
MW7IC2750NR1[18a]	I/O	2500–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1618/– (TO–270 WB–14)
MW7IC2750GNR1[18a]	I/O	2500–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1618/– (TO–270 WB–14)
MW7IC2750NBR1[18a]	I/O	2500–2700	8 AVG	WiMAX	28	26/2700	17	0.7	1617/– (TO–272 WB–14)
MRF6S27085HR3[18i]	I/O	2600–2700	20 AVG	N–CDMA	28	15.5/2700	23.5	0.56	465/1 (NI–780)
MRF6S27085HSR3[18i]	I/O	2600–2700	20 AVG	N–CDMA	28	15.5/2700	23.5	0.56	465A/1 (NI–780S)
MRF7S27130HR3[18i]	I/O	2500–2700	23 AVG	WiMAX	28	16.5/2700	20	0.36	465/1 (NI–780)
MRF7S27130HSR3[18i]	I/O	2500–2700	23 AVG	WiMAX	28	16.5/2700	20	0.36	465A/1 (NI–780S)
MRF6P27160HR6[18o]	I/O	2600–2700	35 AVG	N–CDMA	28	14.6/2700	22.6	0.31	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.

[46]To be introduced: a) 2Q10; b) 3Q10.

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	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
3400-3800 MHz, Class AB									
MRF7S38010HR3[18i]	I/O	3400-3600	2 AVG	WiMAX	30	15/3400, 3600	17	2.24	465I/1 (NI-400-240)
MRF7S38010HSR3[18i]	I/O	3400-3600	2 AVG	WiMAX	30	15/3400, 3600	17	2.24	465J/1 (NI-400S-240)
MW7IC3825NR1[18a]	I/O	3400-3600	5 AVG	WiMAX	28	25/3600	15	1.3	1886/- (TO-270 WB-16)
MW7IC3825GNR1[18a]	I/O	3400-3600	5 AVG	WiMAX	28	25/3600	15	1.3	1887/- (TO-270 WB-16 Gull)
MW7IC3825NBR1[18a]	I/O	3400-3600	5 AVG	WiMAX	28	25/3600	15	1.3	1329/- (TO-272 WB-16)
MRF7S38040HR3[18i]	I/O	3400-3600	8 AVG	WiMAX	30	14/3400, 3600	15.6	0.83	465I/1 (NI-400-240)
MRF7S38040HSR3[18i]	I/O	3400-3600	8 AVG	WiMAX	30	14/3400, 3600	15.6	0.83	465J/1 (NI-400S-240)
MRF7S38075HR3[18i]	I/O	3400-3600	12 AVG	WiMAX	30	14/3400, 3600	14	0.49	465/1 (NI-780)
MRF7S38075HSR3[18i]	I/O	3400-3600	12 AVG	WiMAX	30	14/3400, 3600	14	0.49	465A/1 (NI-780S)
DC-5800 MHz, Class AB									
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)

[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

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)									
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)

[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

Doherty RF Power Transistors

Table 2. Doherty RF Power Transistors

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
To 1000 MHz									
MDE6IC7120NR1[18a]★	I/O	728–768	25 AVG	W-CDMA	28	34.4/748	40.6	0.90	1866/- (TO-270 WBL-16)
MDE6IC7120GNR1[18a]★	I/O	728–768	25 AVG	W-CDMA	28	34.4/748	40.6	0.90	1867 (TO-270 WBL-16 Gull)
MRF8S7120NR3[18i]★	I/O	728–768	32 AVG	W-CDMA	28	19.2/768	38.1	0.65	2021/1 (OM-780-2)
MRF8S7170NR3[18i]★	I/O	728–768	50 AVG	W-CDMA	28	19.5/748	37	0.37	2021/1 (OM-780-2)
MDE6IC9120NR1[18a]★	I/O	920–960	25 AVG	W-CDMA	28	32/940	38	1.3	1866/- (TO-270 WBL-16)
MDE6IC9120GNR1[18a]★	I/O	920–960	25 AVG	W-CDMA	28	32/940	38	1.3	1867/- (TO-270 WBL-16 Gull)
MRFE6S9135HSR3[18i]	I/O	920–960	39 AVG	W-CDMA	28	21/940	32.3	0.48	465C/1 (NI-880S)
MRF8S9170NR3[18i]★	I/O	920–960	50 AVG	W-CDMA	28	19.3/920	36.5	0.38	2021/1 (OM-780-2)
MRF8S9200NR3[18i]★	I/O	920–960	58 AVG	W-CDMA	28	19.9/940	37.1	0.30	2021/1 (OM-780-2)
MRFE6S9205HSR3[18i]	I/O	865–895	58 AVG	W-CDMA	28	21.2/880	34	0.33	465C/1 (NI-880S)
MRF8S9220HR3[18i]★	I/O	920–960	65 AVG	W-CDMA	28	19.4/960	35.7	0.39	465/1 (NI-780)
MRF8S9220HSR3[18i]★	I/O	920–960	65 AVG	W-CDMA	28	19.4/960	35.7	0.39	465A/1 (NI-780S)
MRF8S9260HR3[18i]★	I/O	920–960	75 AVG	W-CDMA	28	18.6/960	38.5	0.37	465B/1 (NI-880)
MRF8S9260HSR3[18i]★	I/O	920–960	75 AVG	W-CDMA	28	18.6/960	38.5	0.37	465C/1 (NI-880S)
MRF8P9300HR6[18o]★	I/O	920–960	100 AVG	W-CDMA	28	19.4/960	35.8	0.22	375D/1 (NI-1230)
MRF8P9300HSR6[18o]★	I/O	920–960	100 AVG	W-CDMA	28	19.4/960	35.8	0.22	375E/1 (NI-1230S)
To 2200 MHz									
MRF7S15100HSR3[18i]	I/O	1470–1510	23 AVG	W-CDMA	28	19.5/1510	32	0.74	465/1 (NI-780)
MRF7S15100HR3[18i]	I/O	1470–1510	23 AVG	W-CDMA	28	19.5/1510	32	0.74	465A/1 (NI-780S)
MD7IC18120NR1[18a]★	I/O	1805–1880	30 AVG	W-CDMA	28	25.8/1880	35.3	0.88	1866/- (TO-270 WBL-16)
MD7IC18120GNR1[18a]★	I/O	1805–1880	30 AVG	W-CDMA	28	25.8/1880	35.3	0.88	1867/- (TO-270 WBL-16 Gull)
MRF8S18120HR3[18i]★	I/O	1805–1880	72 CW	1-Tone	28	18.2/1805	49.8	0.47	465/1 (NI-780)
MRF8S18120HSR3[18i]★	I/O	1805–1880	72 CW	1-Tone	28	18.2/1805	49.8	0.47	465A/1 (NI-780S)
MRF8P18265H[46b]	I/O	1805–1880	72 AVG	W-CDMA	30	16/1840	43.7	—	375I/1 (NI-1230-8)
MRF8P18265HS[46b]	I/O	1805–1880	72 AVG	W-CDMA	30	16/1840	43.7	—	375J/1 (NI-1230S-8)
MD7P19130HR3[18i]	I/O	1930–1990	40 AVG	W-CDMA	28	20/1990	30	0.36	465M/1 (NI-780-4)
MD7P19130HSR3[18i]	I/O	1930–1990	40 AVG	W-CDMA	28	20/1990	30	0.36	465H/1 (NI-780S-4)
MRF6S19140HSR3[18i]	I/O	1930–1990	29 AVG	W-CDMA	28	16/1990	27.5	0.38	465C/1 (NI-880S)
MRF8S19140HR3[18i]★	I/O	1930–1990	34 AVG	W-CDMA	28	19.1/1960	31.4	0.48	465/1 (NI-780)
MRF8S19140HSR3[18i]★	I/O	1930–1990	34 AVG	W-CDMA	28	19.1/1960	31.4	0.48	465A/1 (NI-780S)
MRF6S19200HR3[18i]	I/O	1930–1990	56 AVG	W-CDMA	28	17.9/1990	29.5	0.36	465/1 (NI-780)
MRF7P20040HR3[18i]	I/O	2010–2025	10 AVG	W-CDMA	32	18.2/2025	42.6	2.5	465M/1 (NI-780-4)
MRF7P20040HSR3[18i]	I/O	2010–2025	10 AVG	W-CDMA	32	18.2/2025	42.6	2.5	465H/1 (NI-780S-4)
MRF8P20100HR3[18i]★	I/O	1805–2025	20 AVG	W-CDMA	28	16/2025	44.3	0.88	465M/1 (NI-780-4)
MRF8P20100HSR3[18i]★	I/O	1805–2025	20 AVG	W-CDMA	28	16/2025	44.3	0.88	465H/1 (NI-780S-4)
MD7IC2050NR1[18a]★	I/O	1880–2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1618/- (TO-270 WB-14)
MD7IC2050GNR1[18a]★	I/O	1880–2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1621/- (TO-270 WB-14 Gull)
MD7IC2050NBR1[18a]★	I/O	1880–2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1617/- (TO-272 WB-14)
MRF8P20160H[46a]	I/O	1880–2025	37 AVG	W-CDMA	28	16.5/1920	45.8	0.95	465M/1 (NI-780-4)
MRF8P20160HSR3[18i]★	I/O	1880–2025	37 AVG	W-CDMA	28	16.5/1920	45.8	0.95	465H/1 (NI-780S-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) 2Q10; b) 3Q10.

★New Product

Table 2. Doherty RF Power Transistors (continued)

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
To 2200 MHz (continued)									
MRF5P21045NR1[18a]	I/O	2110–2170	10 AVG	W-CDMA	28	14.5/2110	25.5	1.48	1486/1(TO-270 WB-4)
MD7IC21100NR1[18a]	I/O	2110–2170	32 AVG	W-CDMA	28	28.5/2170	30	0.7	1618/- (TO-270 WB-14)
MD7IC21100GNR1[18a]	I/O	2110–2170	32 AVG	W-CDMA	28	28.5/2170	30	0.7	1621/- (TO-270 WB-14 Gull)
MD7IC21100NBR1[18a]	I/O	2110–2170	32 AVG	W-CDMA	28	28.5/2170	30	0.7	1617/- (TO-272 WB-14)
MRF7S21110HR3[18i]	I/O	2110–2170	33 AVG	W-CDMA	28	17.3/2170	32.5	0.41	465/1 (NI-780)
MRF7S21110HSR3[18i]	I/O	2110–2170	33AVG	W-CDMA	28	17.3/2170	32.5	0.41	465A/1 (NI-780S)
MRF8S21100H[9]	I/O	2110–2170	24 AVG	W-CDMA	28	34.5/2140	6.6	—	465/1 (NI-780)
MRF8S21100HS[9]	I/O	2110–2170	24 AVG	W-CDMA	28	34.5/2140	6.6	—	465A/1 (NI-780S)
MRF8S21120H[46a]	I/O	2110–2170	28 AVG	W-CDMA	28	17.6/2170	34	0.53	465/1 (NI-780)
MRF8S21120HS[46a]	I/O	2110–2170	28 AVG	W-CDMA	28	17.6/2170	34	0.53	465A/1 (NI-780S)
MRF6S21140HR3[18i]	I/O	2110–2170	30 AVG	W-CDMA	28	15.5/2110	27.5	0.38	465B/1 (NI-880)
MRF6S21140HSR3[18i]	I/O	2110–2170	30 AVG	W-CDMA	28	15.5/2110	27.5	0.38	465C/1 (NI-880S)
MRF8S21140HR3[18i]★	I/O	2110–2170	34 AVG	W-CDMA	28	17.9/2140	31.7	0.47	465/1 (NI-780)
MRF8S21140HSR3[18i]★	I/O	2110–2170	34 AVG	W-CDMA	28	17.9/2140	31.7	0.47	465A/1 (NI-780S)
MRF7S21170HR3[18i]	I/O	2110–2170	50 AVG	W-CDMA	28	16/2170	31	0.36	465B/1 (NI-880)
MRF7S21170HSR3[18i]	I/O	2110–2170	50 AVG	W-CDMA	28	16/2170	31	0.36	465C/1 (NI-880S)
MRF8P23080HR3[18i]★	I/O	2300–2400	16 AVG	W-CDMA	28	14.6/2300	42	0.91	465M/1 (NI-780-4)
MRF8P23080HSR3[18i]★	I/O	2300–2400	16 AVG	W-CDMA	28	14.6/2300	42	0.91	465H/1 (NI-780S-4)
MD7IC2755NR1[18a]	I/O	2500–2700	10 AVG	WiMAX	28	25/2700	25	2.05	1618/- (TO-270 WB-14)
MD7IC2755GNR1[18a]	I/O	2500–2700	10 AVG	WiMAX	28	25/2700	25	2.05	1621/- (TO-270 WB-14 Gull)

[9]Product under development.

[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) 2Q10; b) 3Q10.

TD-SCDMA RF Power Transistors

Table 1. TD-SCDMA RF Power Transistors

Product	Frequency Band[37] MHz		P_{out} Watts	Test Signal	V_{DD} Volts	Gain (Typ)/Freq. dB/MHz	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
To 2100 MHz									
MHV5IC2215NR2[18e]	I	1800-2100	0.32 AVG	TD-SCDMA 6C	28	27/2025	3.0	3.5	978/- (PFP-16)
MW6IC2015NBR1[18a]	I	1800-2100	0.32 AVG	TD-SCDMA 6C	28	26/2025	3.0	1.3	1329/-(TO-272 WB-16)
MW6IC2240NBR1[18a]	I/O	2000-2030	4 AVG	TD-SCDMA 6C	28	29/2025	12	1.0	1329/-(TO-272 WB-16)
MRF6S21100HR3[18i]	I/O	2000-2030	4 AVG	TD-SCDMA 6C	28	16/2025	10	0.52	465/1 (NI-780)
MRF7S19080HR3[18i]	I/O	2000-2030	4 AVG	TD-SCDMA 6C	28	18/2025	12	0.69	465/1 (NI-780)
MRF7S19080HSR3[18i]	I/O	2000-2030	4 AVG	TD-SCDMA 6C	28	18/2025	12	0.69	465A/1 (NI-780S)
MW7IC2220NR1[18a]	I/O	2000-2030	5 AVG	TD-SCDMA 6C	28	31/2025	17	1.5	1886/- (TO-270 WB-16)
MW7IC2220GNR1[18a]	I/O	2000-2030	5 AVG	TD-SCDMA 6C	28	31/2025	17	1.5	1887/- (TO-270 WB-16 Gull)
MW7IC2220NBR1[18a]	I/O	2000-2030	5 AVG	TD-SCDMA 6C	28	31/2025	17	1.5	1329/-(TO-272 WB-16)
MD7IC2050NR1[18a]★	I/O	1880-2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1618/- (TO-270 WB-14)
MD7IC2050GNR1[18a]★	I/O	1880-2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1621/- (TO-270 WB-14 Gull)
MD7IC2050NBR1[18a]★	I/O	1880-2025	10 AVG	W-CDMA	28	30.5/2025	34.7	1.9	1617/- (TO-272 WB-14)
MRF7P20040HR3[18i]	I/O	2010-2025	10 AVG	W-CDMA	32	18.2/2025	42.6	2.5	465M/1 (NI-780-4)
MRF7P20040HSR3[18i]	I/O	2010-2025	10 AVG	W-CDMA	32	18.2/2025	42.6	2.5	465H/1 (NI-780S-4)
MRF8P20100HR3[18i]★	I/O	1805-2025	20 AVG	W-CDMA	28	16/2025	44.3	0.88	465M/1 (NI-780-4)
MRF8P20100HSR3[18i]★	I/O	1805-2025	20 AVG	W-CDMA	28	16/2025	44.3	0.88	465H/1 (NI-780S-4)
MRF8P20160H[46a]	I/O	1880-2025	37 AVG	W-CDMA	28	15.3/2025	44	0.95	465M/1 (NI-780-4)
MRF8P20160HSR3[18i]★	I/O	1880-2025	37 AVG	W-CDMA	28	15.3/2025	44	0.95	465H/1 (NI-780S-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) 2Q10; b) 3Q10.

★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	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	0.50	1264/1 (TO–272–6 Wrap)
MRF1570NT1[18j]	U	400–470	70 CW	1–Tone	12.5	10/470	50	0.29	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)
MW7IC008NT1[18f]★	I/O	100–1000	6.5 CW	1–Tone	28	23.5/900	34	3.2	1894 (PQFN 8x8)
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	4.5	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 CW	1–Tone	28	20/960	68	1.0	1265/1 (TO–270–2)
MRFE6S9060NR1[18a]	U	450–1100	60 CW	1–Tone	28	20/960	63	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)
MRF6V3090NR1[18a]★	I	470–860	18 AVG	OFDM	50	22/860	28.5	0.79	1486/1 (TO–270 WB–4)
MRF6VP3450HR6[18o]	I	470–860	450 PEP	2–Tone	50	22.5/860	28	0.27	375D/1 (NI–1230)
1000–3800 MHz									
MMG3005NT1[18f]	I/O	800–2200	1 W CW	1–Tone	5	15/900	—	23.2	1543/1 (PQFN 5x5)
MMG3006NT1[18f]	I/O	400–2200	2 W CW	1–Tone	5	13/900	—	7.8	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	14/2700	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	2500–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1886/– (TO–270 WB–16)
MW7IC2725GNR1[18a]	I/O	2500–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1887/– (TO–270 WB–16 Gull)
MW7IC2725NBR1[18a]	I/O	2500–2700	4 AVG	WiMAX	28	28.5/2700	17	1.4	1329/– (TO–272 WB–16)
MRF6S27050HR3[18i]	I/O	2300–2700	40 CW	W–CDMA	28	17/2600	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	15.5/2700	48	0.50	465/1 (NI–780)
MRF6S23100HR3[18i]	I/O	2200–2500	100 CW	1–Tone	28	15.4/2400	50	0.53	465/1 (NI–780)
MRF6P27160HR6[18o]	I/O	2600–2700	160 CW	1–Tone	28	14.6/2700	48	0.29	375D/1 (NI–1230)
MW7IC3825NR1[18a]	I/O	3400–3600	5 AVG	WiMAX	28	25/3600	15	1.3	1886/– (TO–270 WB–16)
MW7IC3825GNR1[18a]	I/O	3400–3600	5 AVG	WiMAX	28	25/3600	15	1.3	1887/– (TO–270 WB–16 Gull)
MW7IC3825NBR1[18a]	I/O	3400–3600	5 AVG	WiMAX	28	25/3600	15	1.3	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.

★New Product

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	Eff. (Typ) %	θ_{JC} °C/W	Pkg/Style
DC-5800 MHz									
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)

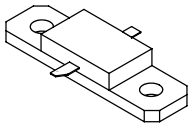
[16]Class A = 4.1

[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.

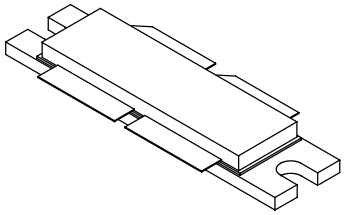
[37]U = Unmatched; I = Input; I/O = Input/Output.

[44]Peak-to-Average Power Ratio = 8.5 dB

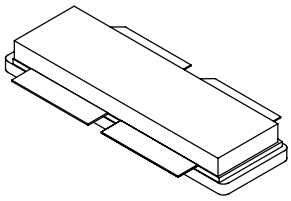
RF Transistor Packages



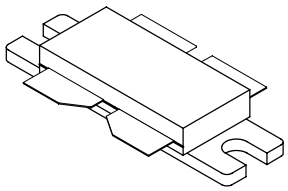
CASE 360D
STYLE 1
(NI-360HF)



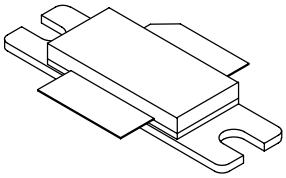
CASE 375D
STYLE 1
(NI-1230)



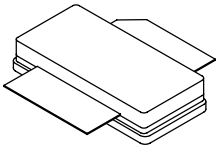
CASE 375E
STYLE 1
(NI-1230S)



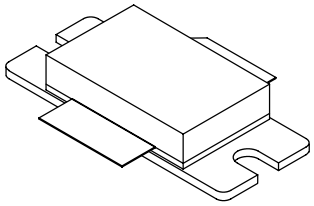
CASE 375G
STYLE 1
(NI-860C3)



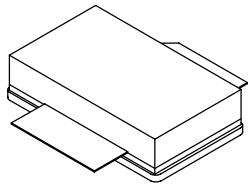
CASE 465
STYLE 1
(NI-780)



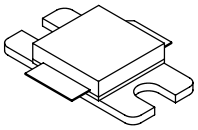
CASE 465A
STYLE 1
(NI-780S)



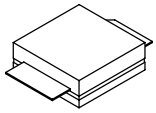
CASE 465B
STYLE 1
(NI-880)



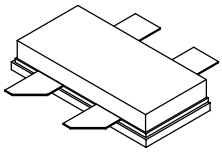
CASE 465C
STYLE 1
(NI-880S)



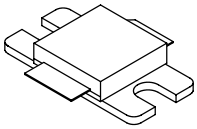
CASE 465E
STYLE 1
(NI-400)



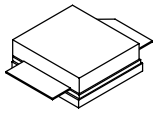
CASE 465F
STYLE 1
(NI-400S)



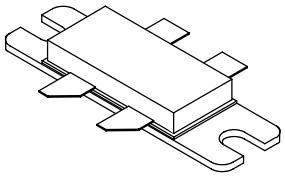
CASE 465H
STYLE 1
(NI-780S-4)



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

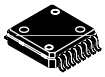


CASE 465J
STYLE 1
(NI-400S-240)

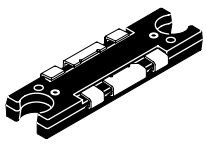


CASE 465M-01
STYLE 1
(NI-780-4)

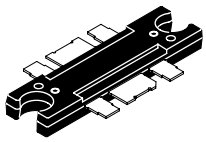
CASE 466
STYLE 1
PLASTIC
(PLD-1.5)



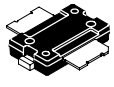
CASE 978
PLASTIC
(PFP-16)



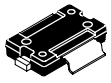
CASE 1264
STYLE 1
PLASTIC
(TO-272-6 Wrap)



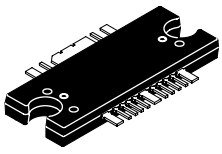
CASE 1264A
STYLE 1
PLASTIC
(TO-272-6)



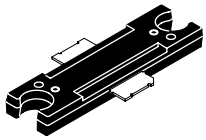
CASE 1265
STYLE 1
PLASTIC
(TO-270-2)



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



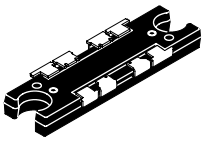
CASE 1329
STYLE 1
PLASTIC
(TO-272 WB-16)



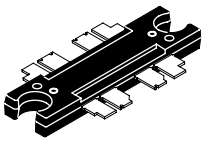
CASE 1337
STYLE 1
PLASTIC
(TO-272-2)

SCALE 1:1

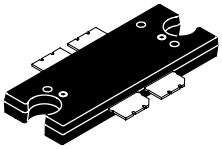
RF Transistor Packages (continued)



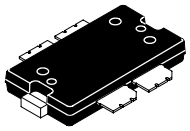
CASE 1366
STYLE 1
PLASTIC
(TO-272-8 Wrap)



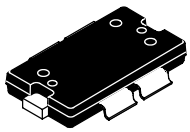
CASE 1366A
STYLE 1
PLASTIC
(TO-272-8)



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

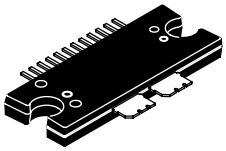


CASE 1486
STYLE 1
PLASTIC
(TO-270 WB-4)

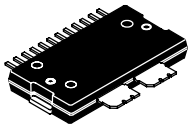


CASE 1487
STYLE 1
PLASTIC
(TO-270 WB-4 Gull)

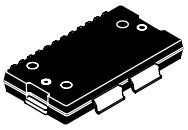
CASE 1543
PLASTIC
(PQFN 5x5)



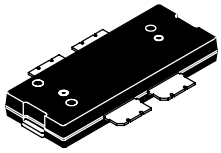
CASE 1617
PLASTIC
(TO-272 WB-14)



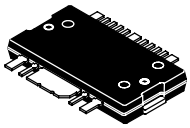
CASE 1618
PLASTIC
(TO-270 WB-14)



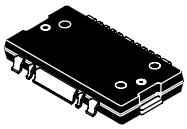
CASE 1621
PLASTIC
(TO-270 WB-14 Gull)



CASE 1730
PLASTIC
(TO-270 WBL-4)



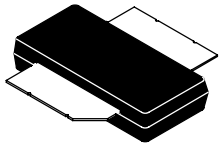
CASE 1886
PLASTIC
(TO-270 WB-16)



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

CASE 1894
PLASTIC
(PQFN 8x8)

CASE 1898
PLASTIC
(PQFN 8x8)



CASE 2021
PLASTIC
(OM780-2)

SCALE 1:1

RF Amplifier ICs

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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Packages	30

RF Amplifier ICs

Complete amplifiers with 50 ohm input impedances are available for all popular base station transmitter systems, including GSM, GSM/EDGE, CDMA, W-CDMA, WiMAX and LTE covering frequencies from 100 MHz up to 3.8 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 120 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
MW7IC008NT1[18f]★	100-1000	6.5	23.5	28	1-Tone	LDMOS	1894 (PQFN 8x8)
MW7IC930NR1[18a]★	728-768	31	35.9	28	W-CDMA	LDMOS	1866/- (TO-270 WBL-16)
MW7IC930GNR1[18a]★	728-768	31	35.9	28	W-CDMA	LDMOS	1867/- (TO-270 WBL-16 Gull)
MW7IC930NBR1[18a]★	728-768	31	35.9	28	W-CDMA	LDMOS	1329/-(TO-272 WB-16)
MDE6IC7120GNR1[18a]★	728-768	120	34.4	28	W-CDMA	LDMOS	1866/- (TO-270 WBL-16)
MDE6IC7120NR1[18a]★	728-768	120	34.4	28	W-CDMA	LDMOS	1867/- (TO-270 WBL-16 Gull)
MW7IC915NT1[18f]★	728-960	15.5	38	28	W-CDMA	LDMOS	1894/- (PQFN 8x8)
MHVIC915NR2[18e]	746-960	15	30	26	N-CDMA	LDMOS	978/- (PFP-16)
MWIC930NR1[18a]	746-960	30	30	27	N-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW4IC915NBR1[18a]	860-960	15	30	26	N-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW4IC915GNBR1[18a]	860-960	15	30	26	N-CDMA	LDMOS	1329A/- (TO-272 WB-16 Gull)
MWE6IC9080NR1[18a]★	865-960	90	28.5	28	1-Tone	LDMOS	1618/- (TO-270 WB-14)
MWE6IC9080GNR1[18a]★	865-960	90	28.5	28	1-Tone	LDMOS	1621/- (TO-270 WB-14 Gull)
MWE6IC9080NBR1[18a]★	865-960	90	28.5	28	1-Tone	LDMOS	1617/- (TO-272 WB-14)
MWE6IC9100GNR1[18a]	869-960	112	33.5	26	1-Tone	LDMOS	1621/- (TO-270 WB-14 Gull)
MWE6IC9100NBR1[18a]	869-960	112	33.5	26	1-Tone	LDMOS	1617/- (TO-272 WB-14)
MDE6IC9120NR1[18a]★	920-960	120	32	28	W-CDMA	LDMOS	1866/- (TO-270 WBL-16)
MDE6IC9120GNR1[18a]★	920-960	120	32	28	W-CDMA	LDMOS	1867/- (TO-270 WBL-16 Gull)
MD7IC18120NR1[18a]★	1805-1880	70	25.8	28	W-CDMA	LDMOS	1866/- (TO-270 WBL-16)
MD7IC18120GNR1[18a]★	1805-1880	70	25.8	28	W-CDMA	LDMOS	1867/- (TO-270 WBL-16 Gull)
MHV5IC1810NR2[18e]	1805-1990	10	29	28	1-Tone	LDMOS	978/- (PFP-16)
MW6IC2015NBR1[18a]	1805-1990	15	26	26	2-Tone	LDMOS	1329/- (TO-272 WB-16)
MW4IC2020NBR1[18a]	1805-1990	20	29	26	2-Tone	LDMOS	1329/- (TO-272 WB-16)
MW7IC18100NR1[18a]	1805-2050	100	30	28	1-Tone	LDMOS	1618/- (TO-270 WB-14)
MW7IC18100GNR1[18a]	1805-2050	100	30	28	1-Tone	LDMOS	1621/- (TO-270 WB-14 Gull)
MW7IC18100NBR1[18a]	1805-2050	100	30	28	1-Tone	LDMOS	1617/- (TO-272 WB-14)
MD7IC2050NR1[18a]★	1880-2025	74	30.5	28	W-CDMA	LDMOS	1618/- (TO-270 WB-14)
MD7IC2050GNR1[18a]★	1880-2025	74	30.5	28	W-CDMA	LDMOS	1621/- (TO-270 WB-14 Gull)
MD7IC2050NBR1[18a]★	1880-2025	74	30.5	28	W-CDMA	LDMOS	1617/- (TO-272 WB-14)
MW6IC1940NBR1[18a]	1920-2000	40	27	28.5	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
MHV5IC2215NR2[18e]	1930-1990	15	27.5	28	N-CDMA	LDMOS	978/- (PFP-16)
MW5IC2030NBR1[18a]	1930-1990	30	23	27	N-CDMA	LDMOS	1329/- (TO-272 WB-16)
MW7IC2040NR1[18a]	1930-1990	30	32	28	W-CDMA	LDMOS	1866/- (TO-270 WBL-16)
MW7IC2040GNR1[18a]	1930-1990	30	32	28	W-CDMA	LDMOS	1867/- (TO-270 WBL-16 Gull)
MW7IC2040NBR1[18a]	1930-1990	30	32	28	W-CDMA	LDMOS	1329/-(TO-272 WB-16)
MW7IC2220NR1[18a]	2110-2170	20	31	28	W-CDMA	LDMOS	1886/- (TO-270 WB-16)
MW7IC2220GNR1[18a]	2110-2170	20	31	28	W-CDMA	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC2220NBR1[18a]	2110-2170	20	31	28	W-CDMA	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.

★New Product

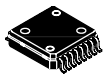
Table 1. Base Station IC Drivers — Class AB (continued)

Product	Frequency MHz	P1dB Watts	Gain (Typ) dB	Supply Voltage Volts	System Application	Die Technology	Pkg/Style
MW6IC2240NBR1[18a]	2110–2170	40	28	28	W-CDMA	LDMOS	1329/- (TO-272 WB-16)
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)
MD7IC2250N[9]	2110–2170	50	30	28	W-CDMA	LDMOS	1618/- (TO-270 WB-14)
MD7IC2250NB[9]	2110–2170	50	30	28	W-CDMA	LDMOS	1617/- (TO-272 WB-14)
MD7IC21100NR1[18a]	2110–2170	110	28.5	28	W-CDMA	LDMOS	1618/- (TO-270 WB-14)
MD7IC21100GNR1[18a]	2110–2170	110	28.5	28	W-CDMA	LDMOS	1621/- (TO-270 WB-14 Gull)
MD7IC21100NBR1[18a]	2110–2170	110	28.5	28	W-CDMA	LDMOS	1617/- (TO-272 WB-14)
MW7IC2725NR1[18a]	2500–2700	25	27.5	28	WiMAX	LDMOS	1886/- (TO-270 WB-16)
MW7IC2725GNR1[18a]	2500–2700	25	27.5	28	WiMAX	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC2725NBR1[18a]	2500–2700	25	27.5	28	WiMAX	LDMOS	1329/- (TO-272 WB-16)
MD7IC2755NR1[18a]	2500–2700	30	25	28	WiMAX	LDMOS	1618/- (TO-270 WB-14)
MD7IC2755GNR1[18a]	2500–2700	30	25	28	WiMAX	LDMOS	1621/- (TO-270 WB-14 Gull)
MW7IC2750NR1[18a]	2500–2700	50	26	28	WiMAX	LDMOS	1618/- (TO-270 WB-14)
MW7IC2750GNR1[18a]	2500–2700	50	26	28	WiMAX	LDMOS	1621/- (TO-270 WB-14 Gull)
MW7IC2750NBR1[18a]	2500–2700	50	26	28	WiMAX	LDMOS	1617/- (TO-272 WB-14)
MW7IC3825NR1[18a]	3400–3600	25	25	28	WiMAX	LDMOS	1886/- (TO-270 WB-16)
MW7IC3825GNR1[18a]	3400–3600	25	25	28	WiMAX	LDMOS	1887/- (TO-270 WB-16 Gull)
MW7IC3825NBR1[18a]	3400–3600	25	25	28	WiMAX	LDMOS	1329/- (TO-272 WB-16)

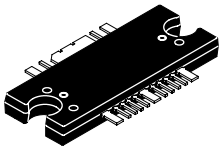
[9]Product under development.

[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.

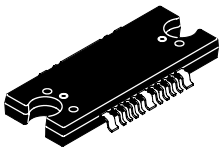
RF Amplifier ICs Packages



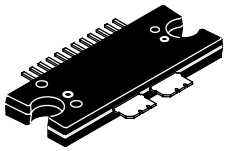
CASE 978
PLASTIC
(PFP-16)



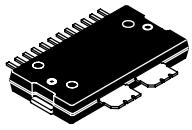
CASE 1329
STYLE 1
PLASTIC
(TO-272 WB-16)



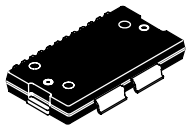
CASE 1329A
STYLE 1
PLASTIC
(TO-272 WB-16 Gull)



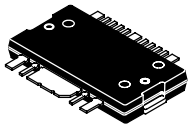
CASE 1617
PLASTIC
(TO-272 WB-14)



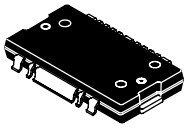
CASE 1618
PLASTIC
(TO-270 WB-14)



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



CASE 1886
PLASTIC
(TO-270 WB-16)



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

CASE 1894
PLASTIC
(PQFN 8x8)

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*	23.2	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.

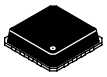
RF General Purpose Amplifiers Packages

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

SCALE 2:1

CASE 1543
PLASTIC
(PQFN 5x5)

SCALE 2:1



CASE 1898
PLASTIC
(QFN 4x4)

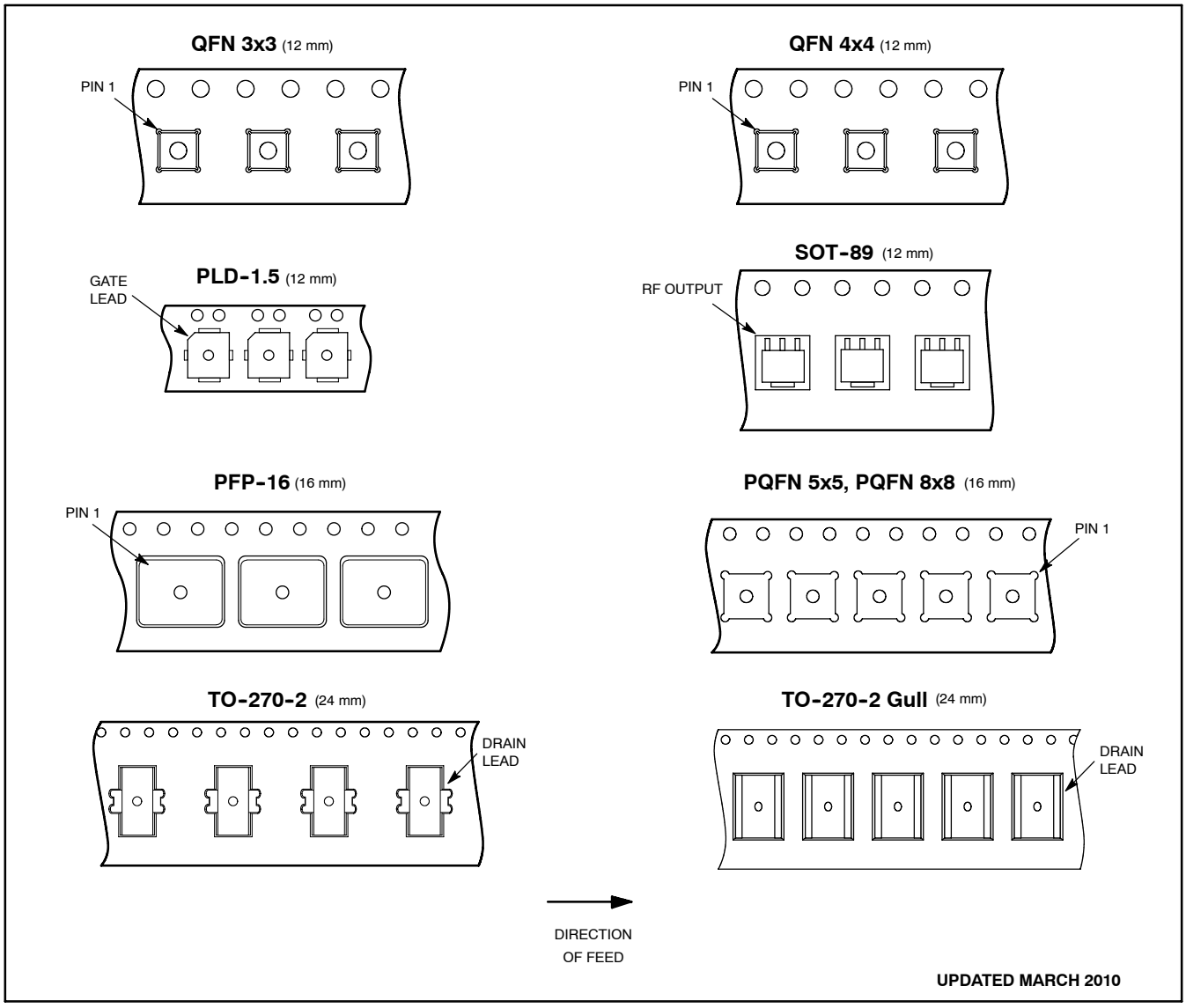
SCALE 2:1

RF Tape and Reel Specifications

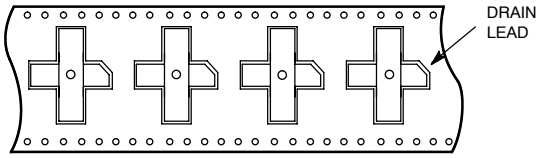
Embossed Tape and Reel is used to facilitate automatic pick and place equipment feed requirements. The tape is used as the shipping container for various products and requires a minimum of handling. The antistatic/conductive tape provides a secure cavity for the product when sealed with the “peel-back” 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, PQFN 8x8 in 16 mm Tape
- TO-270-2, TO-270-2 Gull in 24 mm Tape
- NI-360HF, NI-400, NI-400S, NI-780S-4, OM-780-2 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-270 WBL-16, 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-780-4, NI-860, NI-880, NI-880S, NI-1230, NI-1230S in 56 mm Tape

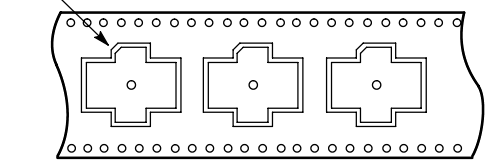
Use the standard device title and add the required suffix as listed in the option table on the following page. Note that the individual reels have a finite number of devices depending on the type of product contained in the tape. Also note the minimum lot size is one full reel for each line item, and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



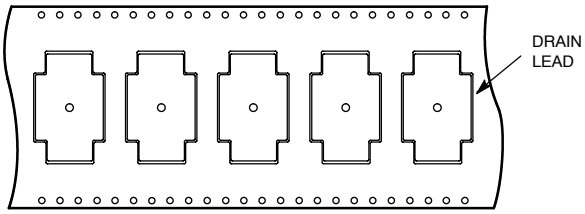
NI-360HF (32 mm)



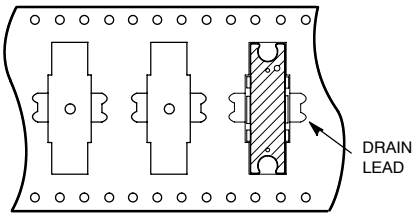
NI-400, NI-400S (32 mm)



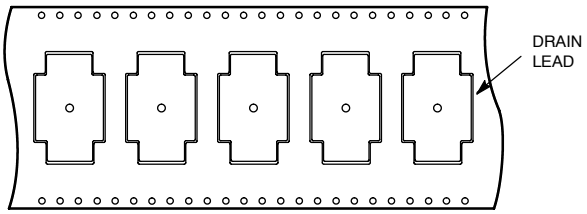
NI-780S-4, OM-780-2 (32 mm)



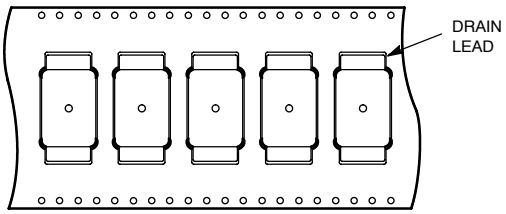
TO-272-2, TO-272-6 Wrap, TO-272-6, TO-272-8, TO-272-8 Wrap (44 mm)



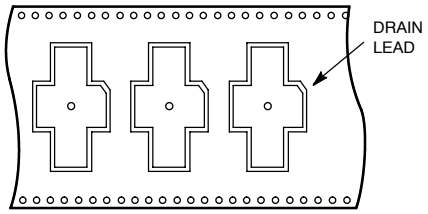
TO-270 WB-4, TO-270 WBL-4, TO-270 WB-14, TO-270 WB-16, TO-270 WBL-16, TO-272 WB-4, TO-272 WB-14, TO-272 WB-16 (44 mm)



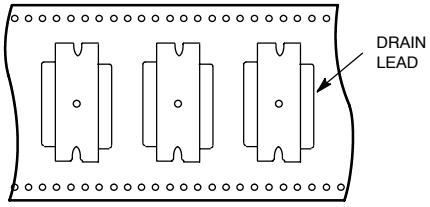
TO-270 WB-14 Gull, TO-270 WB-16 Gull, TO-272 WB-16 Gull (44 mm)

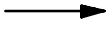


NI-780, NI-780S, NI-780-4 (56 mm)



NI-860 (56 mm)





DIRECTION
OF FEED

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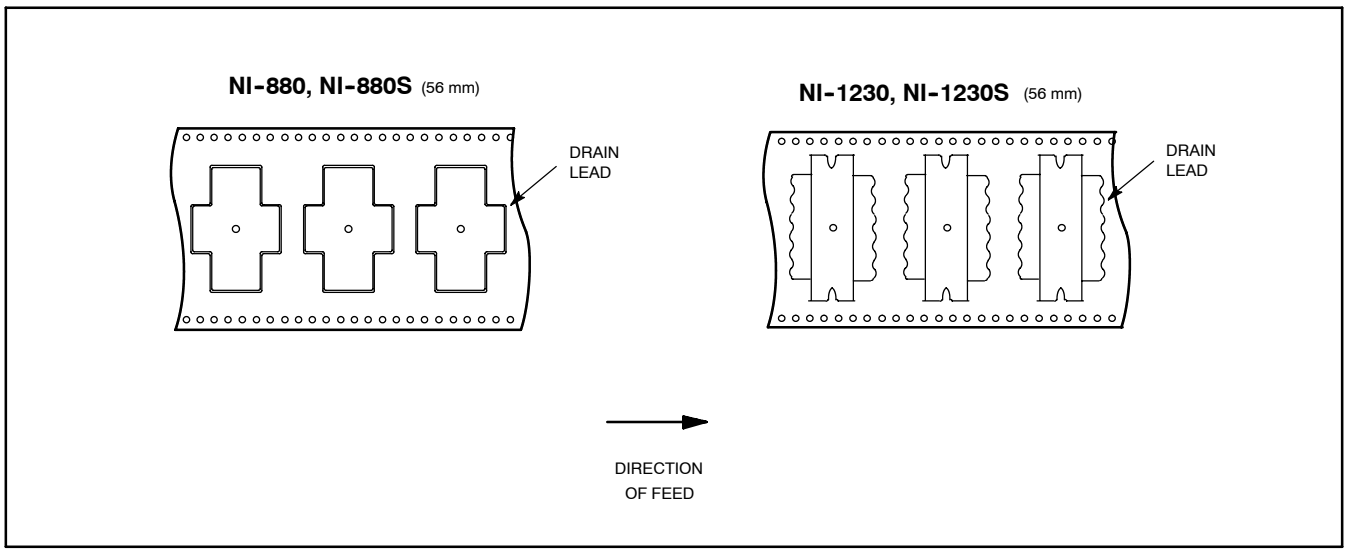
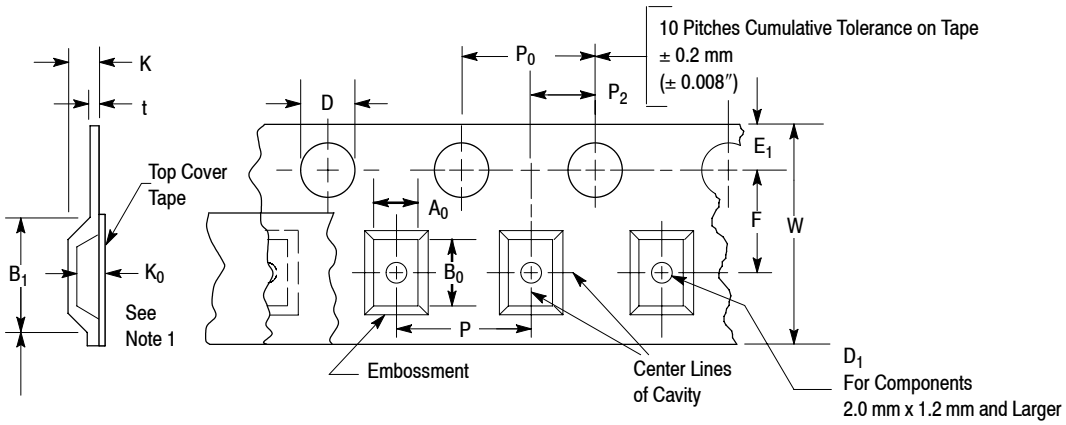

NI-880, NI-880S (56 mm)
DRAIN LEAD
NI-1230, NI-1230S (56 mm)
DRAIN LEAD
DIRECTION OF FEED

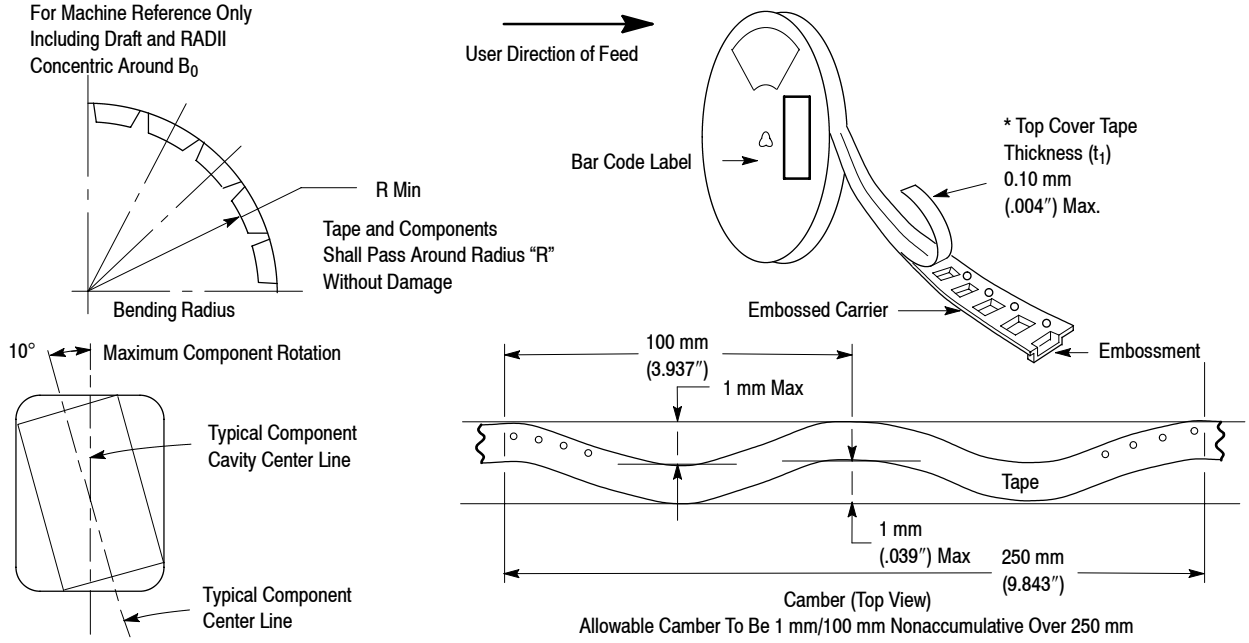
RF EMBOSSED TAPE AND REEL ORDERING INFORMATION

Package	Tape Width (mm)	Pitch mm (inch)	Reel Size mm (inch)	Devices Per Reel and Minimum Order Quantity	Device Suffix
NI-360HF (360D)	32 32	24.0 ± 0.1 (.945 ± .004) 24.0 ± 0.1 (.945 ± .004)	330 (13) 330 (13)	500 50	R1 R5
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-780-4 (465M)	56	32.0 ± 0.1 (1.26 ± .004)	330 (13)	250	R3
NI-780S-4 (465H)	32	28.0 ± 0.1 (1.10 ± .004)	330 (13)	250	R3
NI-860 (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
OM-780-2 (2021)	32	28.0 ± 0.1 (1.10 ± .004)	330 (13)	250	R3
PFP-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
PQFN 8x8 (1894)	16	12.0 ± 0.1 (.472 ± .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-270 WBL-16 (1866)	44	24.0 ± 0.1 (.945 ± .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	20.0 ± 0.1 (.631 ± .004)	330 (13)	500	T1
TO-272-6 Wrap (1264)	44	20.0 ± 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

EMBOSSED TAPE AND REEL DATA FOR DISCRETES

CARRIER TAPE SPECIFICATIONS





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			1.9 mm Max (.076″) SOT-89					12 ± .2 mm (.470 ± .008″) SOT-89
16 mm	12.1 mm (.476″)		1.5 mm Min (.060″)		7.5 ± 0.10 mm (.295 ± .004″)	7.9 mm Max (.311″)		2.0 ± 0.1 mm (.079 ± .004″)		0.4 mm (.016″)	16 ± .3 mm (.642 ± .008″)
	6.1 mm (.241″) PQFN 5x5					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		0.30 mm (.012″) PQFN 5x5 PQFN 8x8	
	8.4 mm (.331″) PQFN 8x8					2.4 mm Max (.094″) PQFN 8x8	4.0 ± 0.1 mm (.157 ± .004″)	2.0 ± 0.1 mm (.079 ± .004″)			
24 mm	20.1 mm (.791″)				11.5 ± 0.1 mm (.453 ± .004″)	11.9 mm Max (.468″)				0.4 mm (.016″)	24.3 mm (.957″)
	11.1 mm (.437″) TO-270-2 Gull					2.82 mm Max (.111″) TO-270-2 Gull				0.338 mm (.013″) TO-270-2 Gull	
32 mm	23.0 mm (.906″)		1.5 mm Min (.059″)		14.2 ± 0.1 mm (.559 ± .004″)	4.6 mm (.181″) NI-360/HF/S			50 mm (1.969″)	0.6 mm (.024″)	32.2 mm (1.272″)
						4.3 mm (.169″) NI-400/S					
						5.34 mm (.210″) NI-600/S					
	21 mm (.827″) NI-780S-4 OM-780-2		2.0 mm Min (.079″) NI-780S-4 OM-780-2			5.1 mm Max (.201″) NI-780S-4 OM-780-2				0.30 mm (.012″) NI-780S-4 OM-780-2	32 ± .3 mm (1.26 ± .012″) NI-780S-4 OM-780-2

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

NOTE 1: A_0, B_0, and K_0 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. 38.

(continued)

DIMENSIONS (continued)

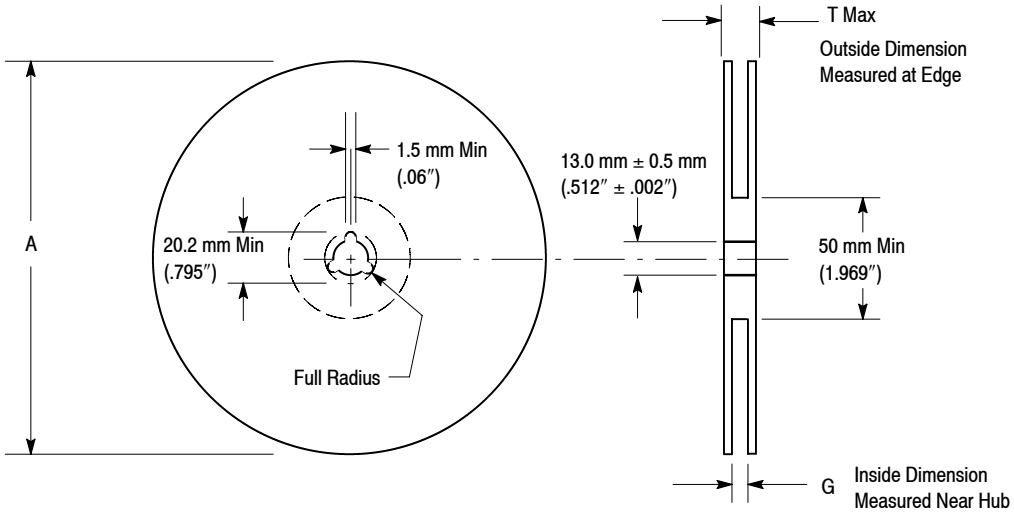
Tape Size	B_1 Max	D	D_1	E_1	F	K	P_0	P_2	R Min	t Max	W Max
44 mm	35.0 mm (1.378″)	1.5 + 0.1 mm - 0.0 (.059 + .004″ - 0.0)	2.0 mm Min (.079″)	1.75 ± 0.1 mm (.069 ± .004″)	11.5 ± 0.1 mm (.453 ± .004″)	15.9 mm Max (.625″)	4.0 ± 0.1 mm (.157 ± .004″)	2.0 ± 0.15 mm (.079 ± .006″)	50 mm (1.969″)	0.6 mm (.024″)	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				20.2+ 0.15 mm (0.795± .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			.318 mm (.012″) TO-272 WB-4, TO-272 WB-16	
	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			.343 mm (.013″) TO-272 WB-16 Gull	
	25.8 ± 0.1 mm (1.016 ± .004″) TO-270 WBL-16					4.2 ± 0.1 mm (0.165 ± .004″) TO-270 WBL-16	24.0 ± 0.1 mm (.945 ± .004″) TO-270 WBL-16			0.32 ± 0.05 mm (.024 ± .002″) TO-270 WBL-16	
56 mm	34.7 mm (1.366″) NI-780/S NI-860 NI-880/S				26.2 ± 0.15 mm (1.031 ± .006″) NI-780/S NI-860 NI-880/S	4.5 mm (0.177″) NI-780/S	4.0 ± 0.1 mm (.157 ± .004″)	2.0 ± 0.15 mm (.079 ± .006″) NI-780/S NI-860 NI-880/S		0.6 mm (.024″) NI-780/S NI-860 NI-880/S	56 ± .30 mm (2.205 ± .012″)
						5.0 mm (0.197″) NI-860					
						5.23 mm (0.206″) NI-880/S					
	35.25 mm (1.388″) NI-780-4				14.2 ± 0.1 mm (.559 ± .004″) NI-780-4	5.1 mm (.201″) NI-780-4		2.0 ± 0.1 mm (.079 ± .004″) NI-780-4		0.4 mm (.016″) NI-780-4	
	41.6 mm (1.638″) NI-1230				26.2 ± 0.15 mm (1.031 ± .006″) NI-1230	5.2 mm (0.205″) NI-1230		2.0 ± 0.15 mm (.079 ± .006″) NI-1230		0.6 mm (.024″) NI-1230	

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

NOTE 1: A_0, B_0, and K_0 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. 38.

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 (12.992″)	16.4 mm + 2.0 mm, – 0.0 (.646″ + .078″, – 0.00)	22.4 mm (.882″)
16 mm PQFN 5x5 PQFN 8x8	360 mm (14.173″)	16.4 mm + 2.0 mm, – 0.0 (.646″ + .078″, – 0.00)	22.4 mm (.882″)
24 mm	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 (14.173″)	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, WBL–16, TO–272 WB–4, WB–14, WB–16, WB–16 Gull		45.3 mm + 0.5 mm, – 0.0 (1.785″+ 0.02″, – 0.00)	
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

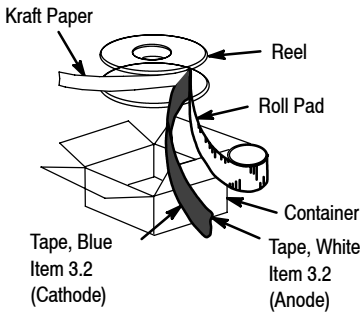


Figure 1. Reel Packing

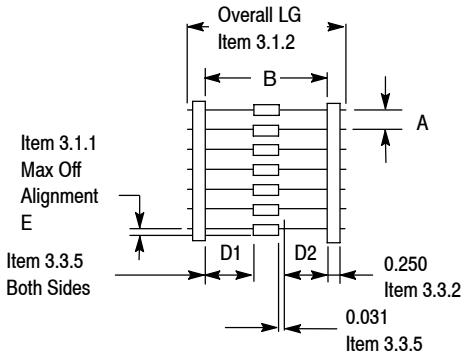


Figure 2. Component Spacing

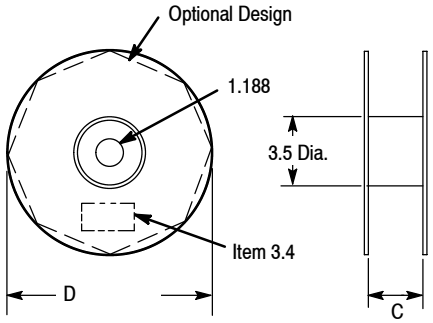


Figure 3. Reel Dimensions

Applications and Product Literature

Application Notes of special interest to designers of RF equipment are listed below. This technical documentation is available on the Freescale Semiconductor 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 the Access Data On-line section.

Application Notes

AN211A Field Effect Transistors in Theory and Practice
AN419 UHF Amplifier Design Using Data Sheet Design Curves
AN423 Field Effect Transistor RF Amplifier Design Techniques
AN548A Microstrip Design Techniques for UHF Amplifiers
AN721 Impedance Matching Networks Applied to RF Power Transistors
AN923 800 MHz Test Fixture Design
AN1032 How Load VSWR Affects Non-Linear Circuits
AN1033 Match Impedances in Microwave Amplifiers
AN1034 Three Balun Designs for Push-Pull Amplifiers
AN1526 RF Power Device Impedances: Practical Considerations
AN1530 Advanced Amplifier Concept 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
AN1907 Solder Reflow Attach Method for High Power RF Devices in Plastic Packages
AN1908 Solder Mounting Method for the MRF19090S and Similar Packages
AN1923 Mounting Method with Mechanical Fasteners for the MRF19090 and Similar Packages
AN1938 Sensitivity of High Power RF Transistors to Source and Output Loads
AN1949 Mounting Method for the MHVIC910HR2 (PFP-16) and Similar Surface Mount Packages
AN1955 Thermal Measurement Methodology of RF Power Amplifiers
AN1977 Quiescent Current Thermal Tracking Circuit in the RF Integrated Circuit Family
AN1987 Quiescent Current Control for the RF Integrated Circuit Device Family
AN3100 General Purpose Amplifier Biasing
AN3263 Bolt Down Mounting Method for High Power RF Transistors and RFICs in Over-Molded Plastic Packages
AN3778 PCB Layout Guidelines for PQFN/QFN Style Packages Requiring Thermal Vias for Heat Dissipation
AN3789 Clamping of High Power RF Transistors and RFICs in Over-Molded Plastic Packages
AN4005 Thermal Management and Mounting Method for the PLD 1.5 RF Power Surface Mount Package

Product Literature

BR1593 Industrial Solutions
BR1606 GPA Solutions
BR1607 Broadcast Solutions
BR1608 Commercial Aerospace Solutions
HV8WCDMAFS HV8 2.1 GHz Product Family
RFMMICPRODFS Freescale Extends RF MMIC Offerings
SG46 RF Product Selector Guide
50VRFLDMOSWP 50V RF LDMOS White Paper

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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
MMG3001NT1	—	—	MMG3012NT1
MMG3002NT1	—	—	MMG3H21NT1
MMG3003NT1	—	—	MMG3014NT1
MMG3013NT1	—	—	MMG3H21NT1
MRF282ZR1	—	—	MHV5IC2215NR2, MRF6S20010GNR1
MRF373ALR1	—	—	MRFE6S9060NR1
MRF9030LR1	—	—	MWIC930NR1, MRFE6S9045NR1
MRF9030NR1	—	—	MWIC930NR1, MRFE6S9045NR1
MRF9045LR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9045LSR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9045NR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9060LR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9060NR1	—	—	MRFE6S9045NR1, MRFE6S9060NR1
MRF9135LSR3	—	—	MRFE6S9125NR1, MRFE6S9130HSR3, MRFE6S9130HR3, MRFE6S9135HSR3
MRF18085ALSR3	—	—	MRF8S18120HSR3, MRF7S18125AHSR3, MRF7S19080HSR3, MRF6S19100NR1, MRF7S19100NR1, MRF7S19100NBR1
MRF21010LSR1	—	—	MHV5IC2215NR2, MRF6S20010GNR1
MRF21030LR3	—	—	MRF5P21045NR1, MW5IC2030NBR1, MRF6S21050LR3, MD7IC2050NBR1, MW7IC2040NBR1, MW6IC2240NBR1
MRF21045LR3	—	—	MRF5P21045NR1, MRF6S21050LR3, MW6IC2240NBR1
MRF21045LSR3	—	—	MRF5P21045NR1, MRF6S21050LSR3, MW7IC2220GNR1, MW7IC2040GNR1, MW7IC2240GNR1

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life			
MHL19338NN	Past	Past	None
MHL21336NN	Past	Past	None
MHL9236NN	Past	Past	None
MMG1001NT1	Past	Past	None
MMG2401NR2	Past	Past	None
MMG3010NT1	Past	Past	MMG3007NT1
MRF18030ALSR3	Past	Past	MRF6S18060NR1
MRF18060ALR3	Past	Past	MRF6S18060NR1, MRF8S18120HR3, MRF7S18125AHR3, MRF7S19080HR3
MRF18090AR3	Past	Past	MRF8S18120HR3, MRF7S18125AHR3, MRF7S18170HR3, MRF7S19080HR3
MRF19030LR3	Past	Past	MW5IC2030NBR1
MRF19030LSR3	Past	Past	MRF5S19060NR1, MRF7S19080HSR3, MRF6S20010NR1
MRF19045LR3	Past	Past	MRF8S18120HR3, MRF7S18125AHR3, MRF5S19060NBR1, MRF5S19060NR1, MW6IC1940NBR1, MRF7S19080HR3
MRF19045LSR3	Past	Past	MRF6S18060NR1, MRF8S18120HSR3, MRF5S19060NR1, MRF7S19080HSR3
MRF19085LR3	Past	Past	MRF7S19080HR3, MRF6S19100HR3, MRF7S19100NBR1, MRF8S19140HSR3, MRF7S19170HR3
MRF19085LSR3	Past	Past	MRF8S18120HSR3, MRF7S19080HSR3, MRF6S19140HSR3, MRF8S19140HSR3
MRF19090SR3	Past	Past	MRF8S18120HSR3, MRF7S19080HSR3, MRF6S19140HSR3, MRF8S19140HSR3
MRF19125R3	Past	Past	MRF7S19120NR1, MRF8S19140HR3
MRF21010LR1	Past	Past	MRF6S20010NR1, MRF6S21050LR3
MRF21085LSR3	Past	Past	MRF7S21080HSR3, MRF8S21100HS, MRF7S21110HSR3
MRF281SR1	Past	Past	MW6S004NT1
MRF281ZR1	Past	Past	MW6S004NT1
MRF282SR1	Past	Past	MHV5IC2215NR2, MRF6S20010NR1
MRF284LR1	Past	Past	MRF6S20010NR1, MRF6S21050LR3
MRF372R3	Past	Past	MRFE6P9220HR3
MRF372R5	Past	Past	MRFE6P9220HR3
MRF373ALSR1	Past	Past	MRFE6S9060NR1
MRF373LSR1	Past	Past	MRFE6S9060NR1
MRF373ALR5	Past	Past	MRFE6S9060NR1
MRF373ALSR5	Past	Past	MRFE6S9060NR1
MRF373LSR5	Past	Past	MRFE6S9060NR1
MRF374A	Past	Past	MRFE6S9060NR1
MRF377HR5	Past	Past	MRF377HR3
MRF5P21240HR6	Past	Past	MRF6S21190HSR3, MRF7S21170HR3, MRF8S21200HR6

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF5S19090HSR3	Past	Past	MRF7S19100NR1, MRF7S19100NBR1, MRF7S19120NR1, MRF6S19140HSR3, MRF8S19140HR3
MRF5S19100HR3	Past	Past	MRF6S19100HR3, MRF7S19100NBR1, MRF7S19100NR1, MRF7S19120NR1, MRF6S19140HSR3, MRF8S19140HR3
MRF5S19100HSR3	Past	Past	MRF7S19100NR1, MRF7S19120NR1, MRF6S19140HSR3, MRF8S19140HSR3
MRF5S19130HR3	Past	Past	MRF6S19140HSR3, MRF8S19140HR3, MRF7S19170HR3
MRF5S19150HSR3	Past	Past	MRF6S19140HSR3, MRF8S19140HSR3, MRF7S19170HSR3
MRF5S21090HR3	Past	Past	MRF6S21100HR3, MRF8S21100H, MRF7S21110HR3
MRF5S21090HSR3	Past	Past	MRF8S21100HS, MRF7S21110HSR3
MRF5S21100HR3	Past	Past	MRF6S21100HR3, MRF8S21100H, MRF7S21110HR3
MRF5S21100HSR3	Past	Past	MRF8S21100HS, MRF7S21110HSR3
MRF5S21130HR3	Past	Past	MRF7S21110HR3, MRF6S21140HR3, MRF7S21150HR3, MRF7S21170HR3
MRF5S21130HSR3	Past	Past	MRF7S21110HSR3, MRF6S21140HSR3, MRF7S21150HSR3, MRF7S21170HSR3
MRF5S4140HR3	Past	Past	MRF6V2150NBR1, MRF6V3090NBR1
MRF5S4140HSR3	Past	Past	MRF6V2150NR1, MRF6V3090NR1
MRF5S9150HR3	Past	Past	MRFE6S9130HR3, MRFE6S9160HR3, MRFE6S9160HSR3, MRF8S9170NR3, MRFE6S9200HR3, MRFE6S9201HR3
MRF6522-70R3	Past	Past	MRFE6S9060NR1
MRF6P3300HR3	Past	Past	MRFE6P3300HR3
MRF6P9220HR3	Past	Past	MRFE6P9220HR3, MRFE6P3300HR3, MRF6VP3450HR6
MRF6S18140HR3	Past	Past	MRF8S19140HR3, MRF7S19170HR3
MRF6S18140HSR3	Past	Past	MRF6S19140HSR3, MRF8S19140HSR3, MRF7S19170HSR3
MRF6S19120HR3	Past	Past	MRF6S19100HR3, MRF7S19100NBR1, MRF7S19120NR1
MRF6S19120HSR3	Past	Past	MRF7S19100NR1, MRF7S19120NR1
MRF6S9045NBR1	Past	Past	MRFE6S9045NR1
MRF6S9045NR1	Past	Past	MRFE6S9045NR1
MRF6S9060NBR1	Past	Past	MRFE6S9060NR1
MRF6S9060NR1	Past	Past	MRFE6S9060NR1
MRF6S9125NBR1	Past	Past	MRFE6S9125NBR1
MRF6S9125NR1	Past	Past	MRFE6S9125NR1
MRF6S9130HR3	Past	Past	MRFE6S9130HR3
MRF6S9130HSR3	Past	Past	MRFE6S9130HR3, MRFE6S9135HSR3

END OF LIFE PRODUCT INDEX — continued

Product	Last Order Date	Last Ship Date	Possible Replacement
End of Life — continued			
MRF6S9160HR3	Past	Past	MRFE6S9160HSR3, MRF8S9170NR3, MRFE6S9200HR3
MRF6S9160HSR3	Past	Past	MRFE6S9160HSR3
MRF9002NR2	Past	Past	MW6S004NT1
MRF9030LSR1	Past	Past	MWIC930NR1, MW7IC930GNR1, MRF8P9040N, MRFE6S9045NR1, MRFE6S8046NR1, MRFE6S9046NR1
MRF9030NBR1	Past	Past	MWIC930NR1
MRF9045NBR1	Past	Past	MRFE6S9045NR1
MRF9060LSR1	Past	Past	MRFE6S9060NR1
MRF9060NBR1	Past	Past	MRFE6S9060NR1
MRF9080LR3	Past	Past	MRFE6S9060NR1, MRF5S9080NBR1
MRF9085LR3	Past	Past	MRF5S9080NBR3, MRFE6S9130HR3
MRF9085LSR3	Past	Past	MRFE6S9060NR1, MRF5S9080NR1, MRF5S9100NR1
MRF9120LR3	Past	Past	MRFE6S9130HR3, MRFE6P9220HR3
MRF9135LR3	Past	Past	MRFE6S9130HR3, MRFE6S9135HSR3
MRF9180R6	Past	Past	MRFE6P9220HR3, MRFE6S9200HR3
MRF9210R3	Past	Past	MRF377HR3, MRFE6P9220HR3, MRFE6P3300HR3, MRF6VP3450HR6
MRF9210R3	Past	Past	MRFE6P9220HR3
MRF9582NT1	Past	Past	MW6S004NT1
MRFE6P3300HR5	Past	Past	MRFE6P3300HR3
MW4IC001NR4	Past	Past	MW6S004NT1
MW4IC2230GNBR1	Past	Past	MW4IC2230NBR1
MW6IC1940GNBR1	Past	Past	MW6IC1940NBR1

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