



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



Replaced by MRF5S9101NR1/NBR1. There are no form, fit or function changes with this part replacement. N suffix added to part number to indicate transition to lead-free terminations.

RF Power Field Effect Transistors

N-Channel Enhancement-Mode Lateral MOSFETs

Designed for GSM and GSM EDGE base station applications with frequencies from 869 to 960 MHz. Suitable for multicarrier amplifier applications.

GSM Application

- Typical GSM Performance: $V_{DD} = 26$ Volts, $I_{DQ} = 700$ mA, $P_{out} = 100$ Watts CW, Full Frequency Band (869-894 MHz and 921-960 MHz)
Power Gain - 17.5 dB
Drain Efficiency - 60%

GSM EDGE Application

- Typical GSM EDGE Performance: $V_{DD} = 28$ Volts, $I_{DQ} = 650$ mA, $P_{out} = 50$ Watts Avg., Full Frequency Band (869-894 MHz and 921-960 MHz)
Power Gain — 18 dB
Spectral Regrowth @ 400 kHz Offset = -63 dBc
Spectral Regrowth @ 600 kHz Offset = -78 dBc
EVM — 2.3% rms
- Capable of Handling 10:1 VSWR, @ 26 Vdc, @ 100 W CW Output Power, @ $f = 960$ MHz
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Internally Matched for Ease of Use
- Qualified Up to a Maximum of 32 V_{DD} Operation
- Integrated ESD Protection
- 200°C Capable Plastic Package
- In Tape and Reel. R1 Suffix = 500 Units per 44 mm, 13 inch Reel.

MRF5S9101MR1
MRF5S9101MBR1

869-960 MHz, 100 W, 26 V
GSM/GSM EDGE
LATERAL N-CHANNEL
RF POWER MOSFETs

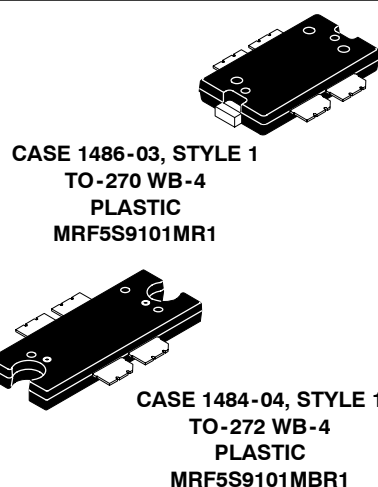


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	- 0.5, +68	Vdc
Gate-Source Voltage	V_{GS}	- 0.5, +15	Vdc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	427 2.44	W W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 65 to +150	$^\circ\text{C}$
Operating Junction Temperature	T_J	200	$^\circ\text{C}$

Table 2. Thermal Characteristics

Characteristic	Symbol	Value ^(1,2)	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$		$^\circ\text{C/W}$
Case Temperature 80°C , 100 W CW		0.41	
Case Temperature 80°C , 50 W CW		0.47	

- MTTF calculator available at <http://www.freescale.com/rf>. Select Tools/Software/Application Software/Calculators to access the MTTF calculators by product.
- Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers*. Go to <http://www.freescale.com/rf>. Select Documentation/Application Notes - AN1955.

NOTE - CAUTION - MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

Table 3. ESD Protection Characteristics

Test Methodology	Class
Human Body Model (per JESD22-A114)	1C (Minimum)
Machine Model (per EIA/JESD22-A115)	A (Minimum)
Charge Device Model (per JESD22-C101)	IV (Minimum)

Table 4. Moisture Sensitivity Level

Test Methodology	Rating	Package Peak Temperature	Unit
Per JESD 22-A113, IPC/JEDEC J-STD-020	3	260	°C

Table 5. Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 68\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$)	I_{DSS}	—	—	10	μAdc
Zero Gate Voltage Drain Leakage Current ($V_{DS} = 26\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$)	I_{DSS}	—	—	1	μAdc
Gate-Source Leakage Current ($V_{GS} = 5\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	—	—	1	μAdc

On Characteristics

Gate Threshold Voltage ($V_{DS} = 10\text{ Vdc}$, $I_D = 400\text{ }\mu\text{Adc}$)	$V_{GS(th)}$	2	2.8	3.5	Vdc
Gate Quiescent Voltage ($V_{DS} = 26\text{ Vdc}$, $I_D = 700\text{ mAdc}$)	$V_{GS(Q)}$	—	3.7	—	Vdc
Drain-Source On-Voltage ($V_{GS} = 10\text{ Vdc}$, $I_D = 2\text{ Adc}$)	$V_{DS(on)}$	—	0.21	0.3	Vdc
Forward Transconductance ($V_{DS} = 10\text{ Vdc}$, $I_D = 6\text{ Adc}$)	g_{fs}	—	7	—	S

Dynamic Characteristics ⁽¹⁾

Output Capacitance ($V_{DS} = 26\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz, $V_{GS} = 0\text{ Vdc}$)	C_{oss}	—	70	—	pF
Reverse Transfer Capacitance ($V_{DS} = 26\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz, $V_{GS} = 0\text{ Vdc}$)	C_{rss}	—	2.2	—	pF

Functional Tests (In Freescale Test Fixture, 50 ohm system) $V_{DD} = 26\text{ Vdc}$, $P_{out} = 100\text{ W}$, $I_{DQ} = 700\text{ mA}$, $f = 960\text{ MHz}$

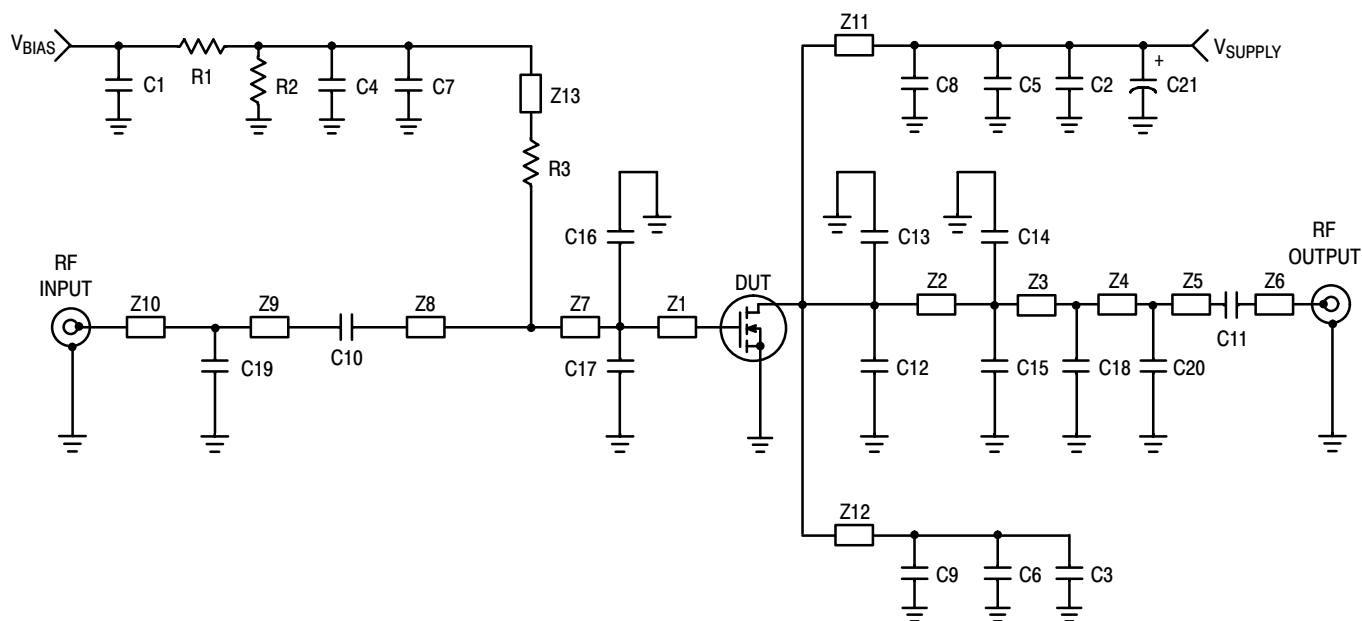
Power Gain	G_{ps}	16	17.5	19	dB
Drain Efficiency	η_D	56	60	—	%
Input Return Loss	IRL	—	-15	-9	dB
P_{out} @ 1 dB Compression Point, CW	P1dB	100	110	—	W

1. Part is internally input matched.

(continued)

Table 5. Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted) **(continued)**

Characteristic	Symbol	Min	Typ	Max	Unit
Typical GSM EDGE Performances (In Freescale GSM EDGE Test Fixture, 50 ohm system) $V_{DD} = 28\text{ Vdc}$, $P_{out} = 50\text{ W Avg.}$, $I_{DQ} = 650\text{ mA}$, $869\text{ MHz} < \text{Frequency} < 894\text{ MHz}$, $920\text{ MHz} < \text{Frequency} < 960\text{ MHz}$					
Power Gain	G_{ps}	—	18	—	dB
Drain Efficiency	η_D	—	42	—	%
Error Vector Magnitude	EVM	—	2.3	—	% rms
Spectral Regrowth at 400 kHz Offset	SR1	—	-63	—	dBc
Spectral Regrowth at 600 kHz Offset	SR2	—	-78	—	dBc



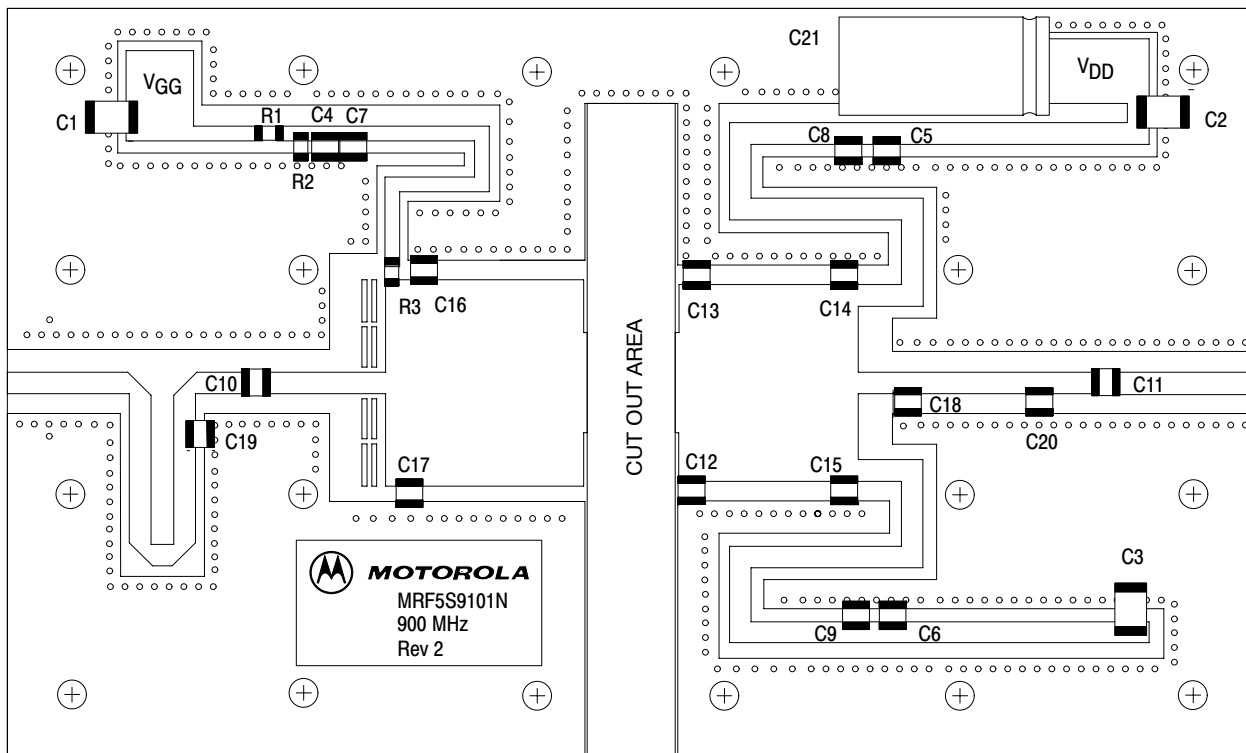
Z1	0.698" x 0.827" Microstrip	Z10	1.491" x 0.087" Microstrip
Z2	0.720" x 0.788" Microstrip	Z11, Z12*	1.6" x 0.089" Microstrip
Z3	0.195" x 0.087" Microstrip		(quarter wave length for supply purpose)
Z4	0.524" x 0.087" Microstrip	Z13*	1.2" x 0.059" Microstrip
Z5	0.233" x 0.087" Microstrip		(quarter wave length for bias purpose)
Z6	0.560" x 0.087" Microstrip	PCB	Taconic TLX8-0300, 0.030", $\epsilon_r = 2.55$
Z7	0.095" x 0.827" Microstrip		
Z8	0.472" x 0.087" Microstrip		
Z9	0.384" x 0.087" Microstrip		

*Variable for tuning

Figure 1. MRF5S9101MR1 (MBR1) 900 MHz Test Circuit Schematic

Table 6. MRF5S9101MR1 (MBR1) 900 MHz Test Circuit Component Designations and Values

Part	Description	Part Number	Manufacturer
C1, C2, C3	4.7 μ F Chip Capacitors (2220)	GRM55ER7H475KA01	Murata
C4, C5, C6	10 nF 200B Chip Capacitors	200B103MW	ATC
C7, C8, C9	33 pF 100B Chip Capacitors	100B330JW	ATC
C10, C11	22 pF 100B Chip Capacitors	100B220GW	ATC
C12, C13	10 pF 100B Chip Capacitors	100B100GW	ATC
C14, C15, C16, C17	8.2 pF 100B Chip Capacitors	100B8R2CW	ATC
C18	5.6 pF 100B Chip Capacitor	100B5R6CW	ATC
C19	4.7 pF 100B Chip Capacitor	100B4R7BW	ATC
C20	3.9 pF 100B Chip Capacitor	100B3R9BW	ATC
C21	220 μ F, 50 V Electrolytic Capacitor, Axial	516D227M050NP7B	Sprague
R1, R2	10 k Ω , 1/4 W Chip Resistors (1206)		
R3	10 Ω , 1/4 W Chip Resistor (1206)		



Freescale has begun the transition of marking Printed Circuit Boards (PCBs) with the Freescale Semiconductor signature/logo. PCBs may have either Motorola or Freescale markings during the transition period. These changes will have no impact on form, fit or function of the current product.

Figure 2. MRF5S9101MR1(MBR1) 900 MHz Test Circuit Component Layout

TYPICAL CHARACTERISTICS - 900 MHz

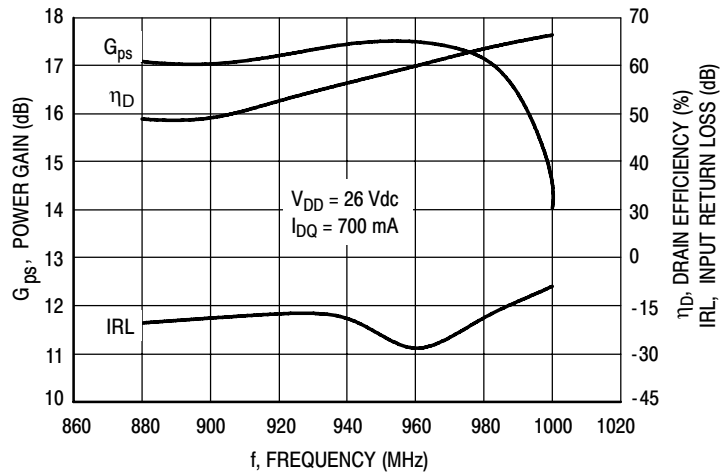


Figure 3. Power Gain, Input Return Loss and Drain Efficiency versus Frequency @ $P_{out} = 100$ Watts CW

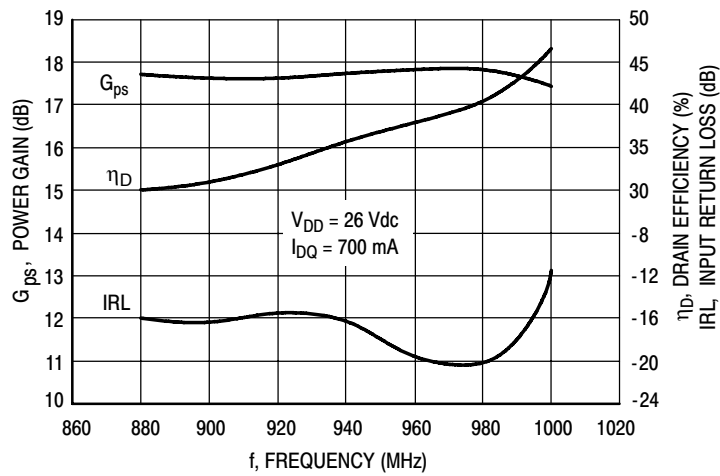


Figure 4. Power Gain, Input Return Loss and Drain Efficiency versus Frequency @ $P_{out} = 40$ Watts CW

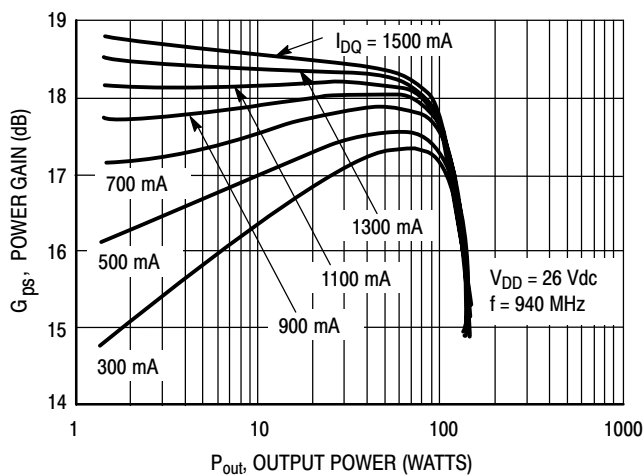


Figure 5. Power Gain versus Output Power

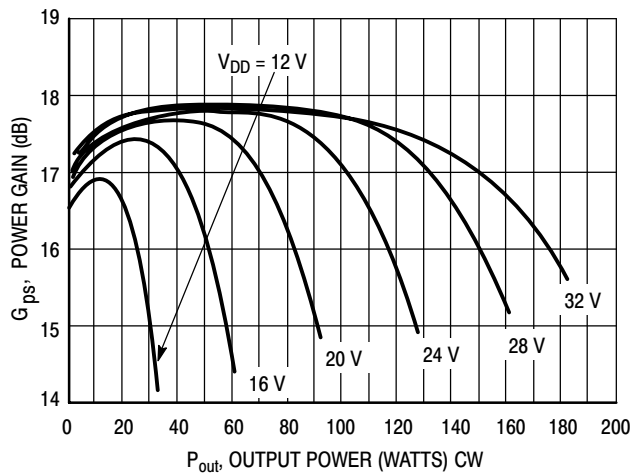


Figure 6. Power Gain versus Output Power

TYPICAL CHARACTERISTICS - 900 MHz

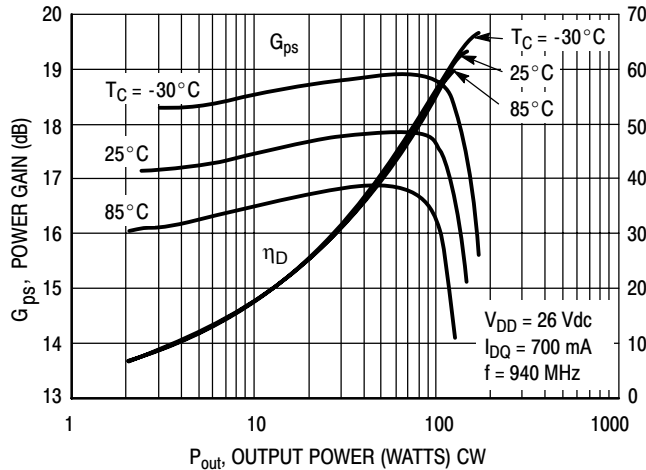


Figure 7. Power Gain and Drain Efficiency versus CW Output Power

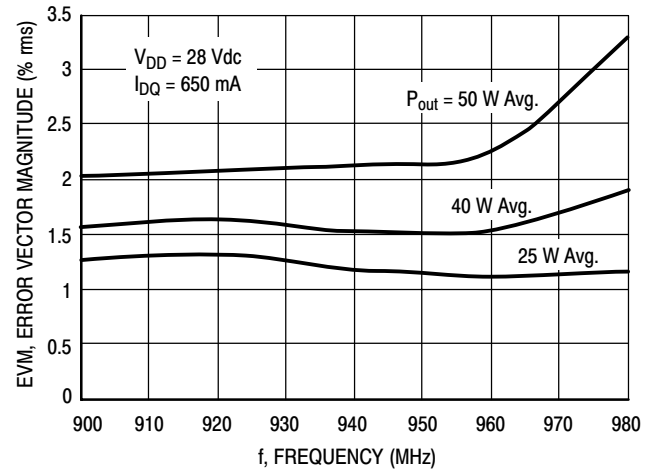


Figure 8. Error Vector Magnitude versus Frequency

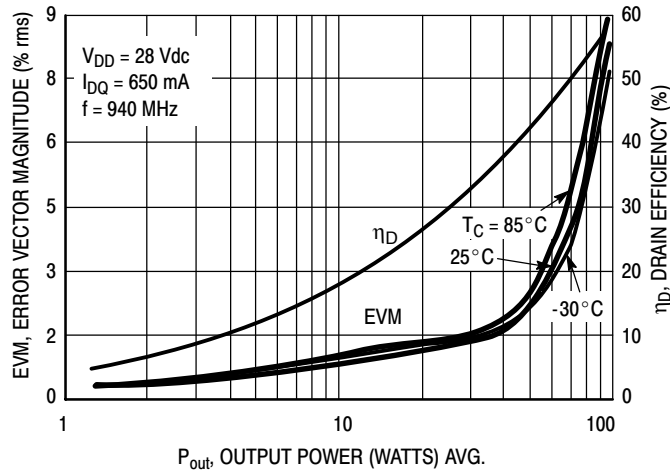


Figure 9. Error Vector Magnitude and Drain Efficiency versus Output Power

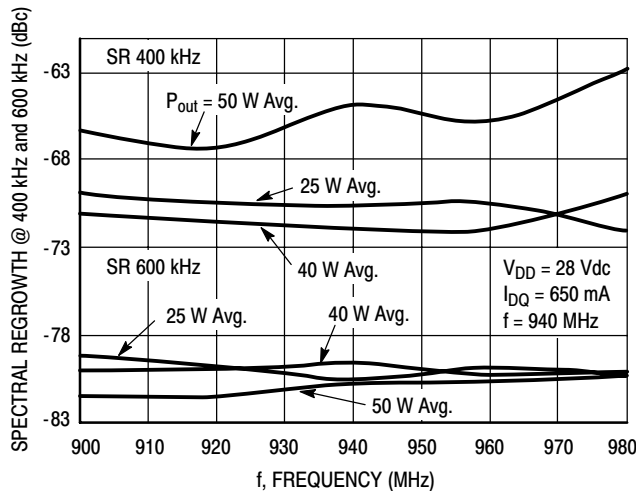


Figure 10. Spectral Regrowth at 400 kHz and 600 kHz versus Frequency

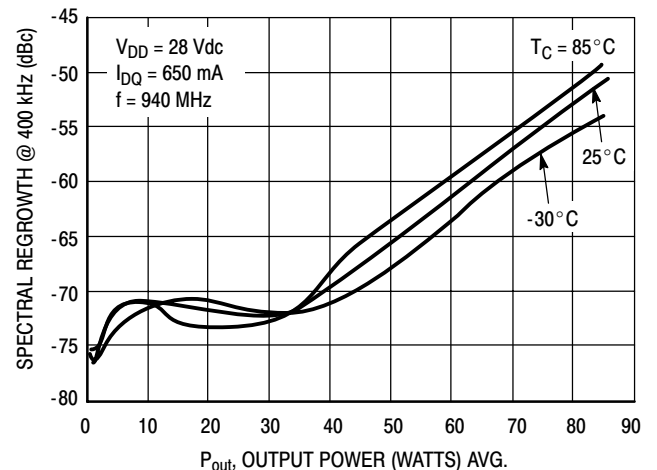


Figure 11. Spectral Regrowth at 400 kHz versus Output Power

TYPICAL CHARACTERISTICS - 900 MHz

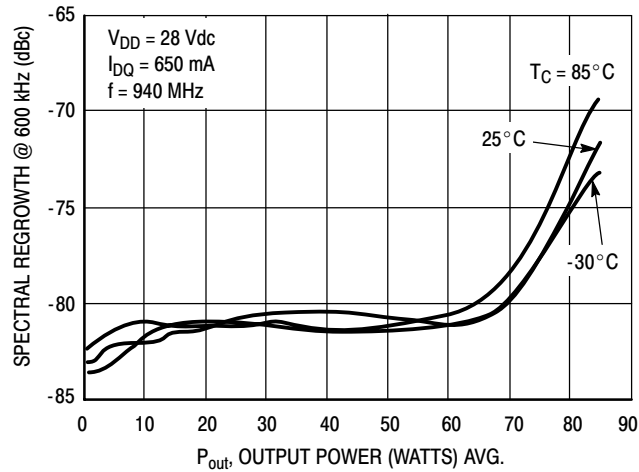
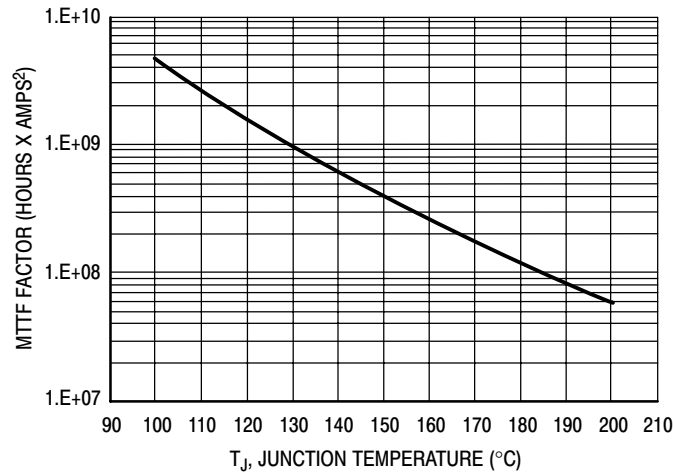
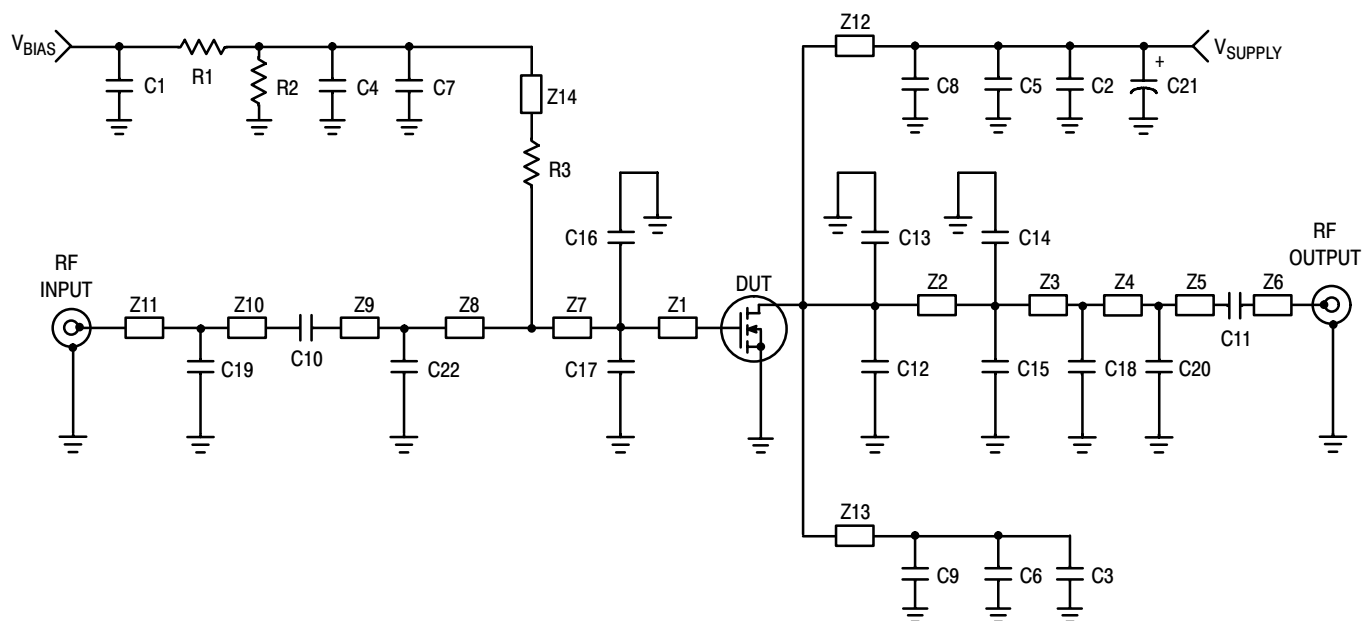


Figure 12. Spectral Regrowth @ 600 kHz versus Output Power



This above graph displays calculated MTTF in hours x ampere² drain current. Life tests at elevated temperatures have correlated to better than $\pm 10\%$ of the theoretical prediction for metal failure. Divide MTTF factor by I_D^2 for MTTF in a particular application.

Figure 13. MTTF Factor versus Junction Temperature

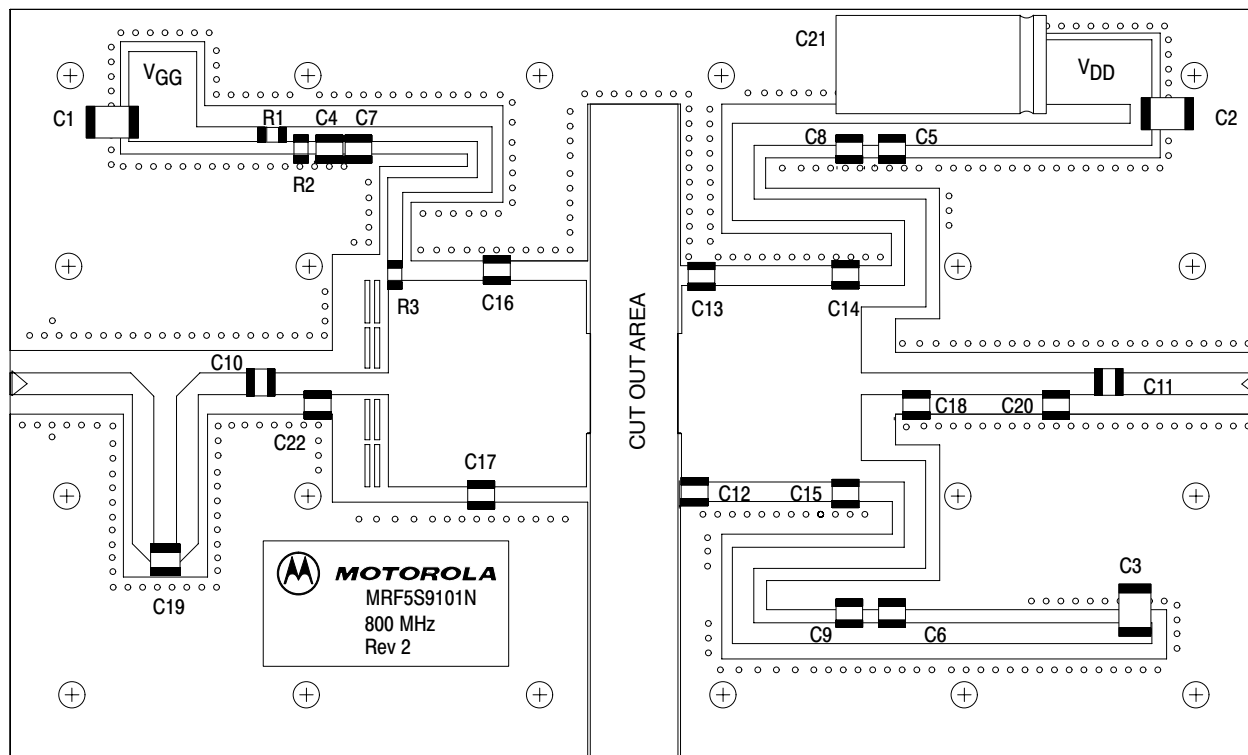


Z1	0.432" x 0.827" Microstrip	Z10	0.897" x 0.087" Microstrip
Z2	0.720" x 0.788" Microstrip	Z11	1.161" x 0.087" Microstrip
Z3	0.195" x 0.087" Microstrip	Z12, Z13*	1.6" x 0.089" Microstrip (quarter wave length for supply purpose)
Z4	0.584" x 0.087" Microstrip	Z14*	1.2" x 0.059" Microstrip (quarter wave length for bias purpose)
Z5	0.173" x 0.087" Microstrip	PCB	Taconic TLX8-0300, 0.030", $\epsilon_r = 2.55$
Z6	0.560" x 0.087" Microstrip		
Z7	0.378" x 0.827" Microstrip		
Z8	0.279" x 0.087" Microstrip		
Z9	0.193" x 0.087" Microstrip		
			*Variable for tuning

Figure 14. MRF5S9101MR1(MBR1) 800 MHz Test Circuit Schematic

Table 7. MRF5S9101MR1(MBR1) 800 MHz Test Circuit Component Designations and Values

Part	Description	Part Number	Manufacturer
C1, C2, C3	4.7 μ F Chip Capacitors (2220)	GRM55ER7H475KA01	Murata
C4, C5, C6	10 nF 200B Chip Capacitors	200B103MW	ATC
C7, C8, C9	33 pF 100B Chip Capacitors	100B330JW	ATC
C10, C11	22 pF 100B Chip Capacitors	100B220GW	ATC
C12, C13, C17	10 pF 100B Chip Capacitors	100B100GW	ATC
C14, C15	8.2 pF 100B Chip Capacitors	100B8R2CW	ATC
C16, C22	6.8 pF 100B Chip Capacitors	100B6R8CW	ATC
C18	5.6 pF 100B Chip Capacitor	100B5R6CW	ATC
C19, C20	2.7 pF 100B Chip Capacitors	100B2R7BW	ATC
C21	220 μ F, 50 V Electrolytic Capacitor, Axial	516D227M050NP7B	Sprague
R1, R2	10 k Ω , 1/4 W Chip Resistors (1206)		
R3	10 Ω , 1/4 W Chip Resistor (1206)		



Freescall has begun the transition of marking Printed Circuit Boards (PCBs) with the Freescall Semiconductor signature/logo. PCBs may have either Motorola or Freescall markings during the transition period. These changes will have no impact on form, fit or function of the current product.

Figure 15. MRF5S9101MR1(MBR1) 800 MHz Test Circuit Component Layout

TYPICAL CHARACTERISTICS - 800 MHz

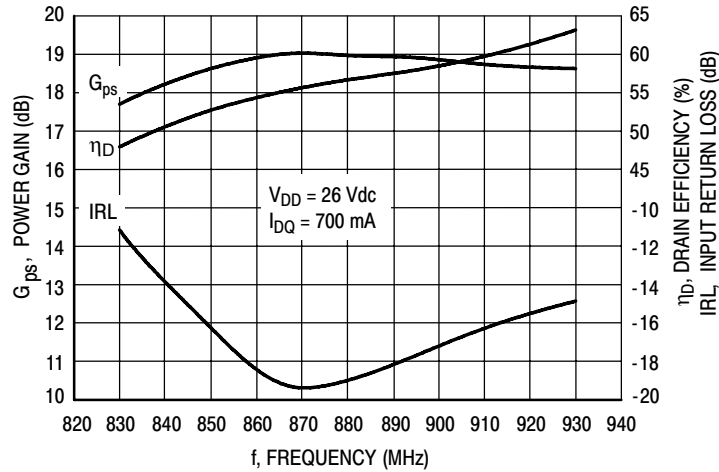


Figure 16. Power Gain, Input Return Loss and Drain Efficiency versus Frequency @ $P_{out} = 100 \text{ W CW}$

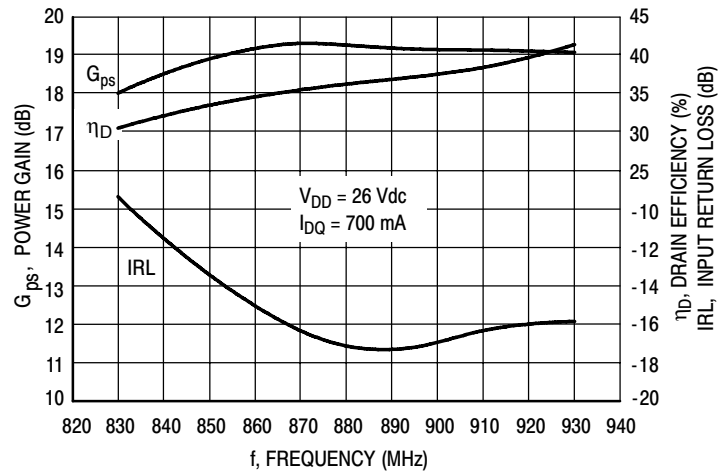


Figure 17. Power Gain, Input Return Loss and Drain Efficiency versus Frequency @ $P_{out} = 40 \text{ W CW}$

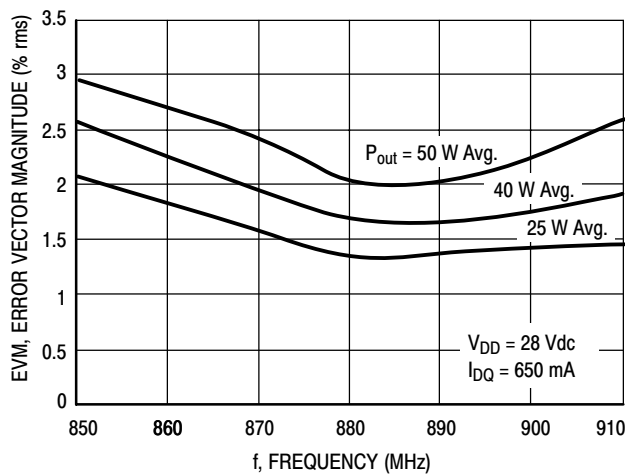


Figure 18. Error Vector Magnitude versus Frequency

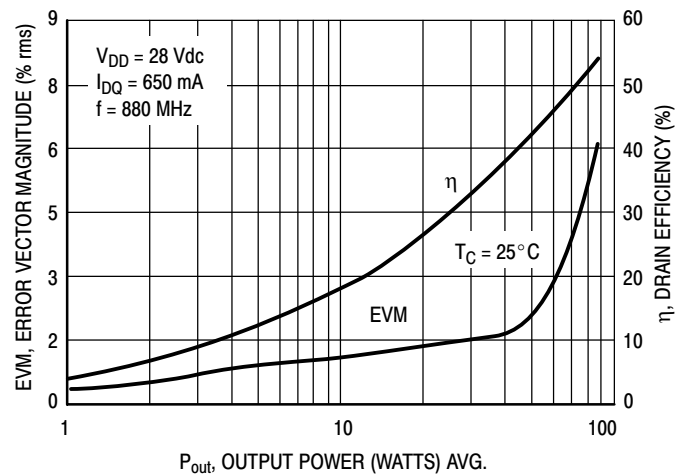


Figure 19. Error Vector Magnitude and Drain Efficiency versus Output Power

TYPICAL CHARACTERISTICS - 800 MHz

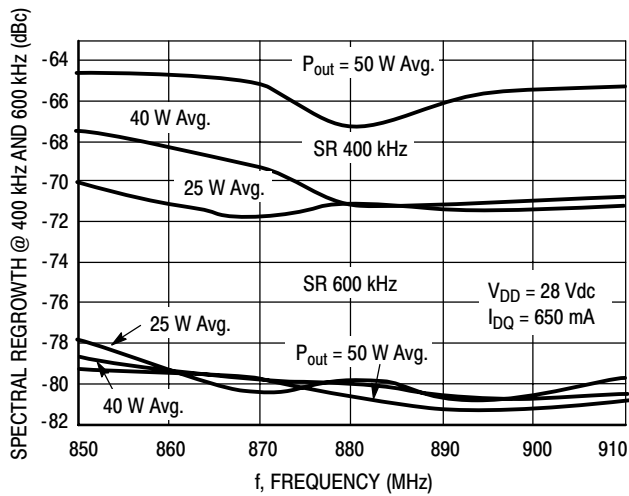


Figure 20. Spectral Regrowth at 400 kHz and 600 kHz versus Frequency

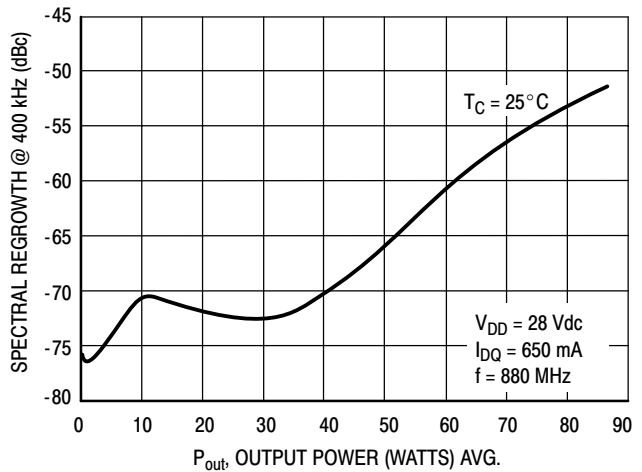


Figure 21. Spectral Regrowth at 400 kHz versus Output Power

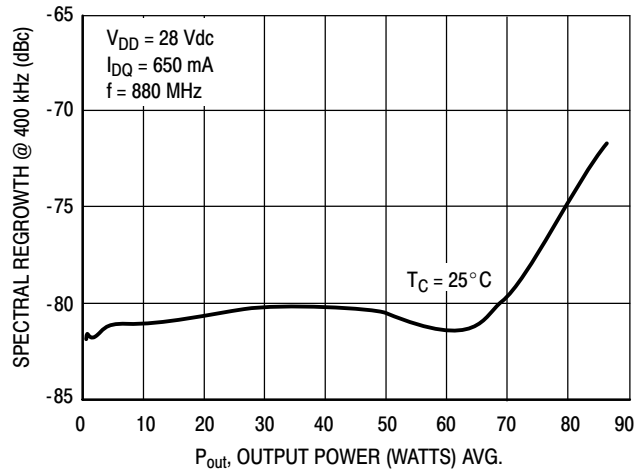
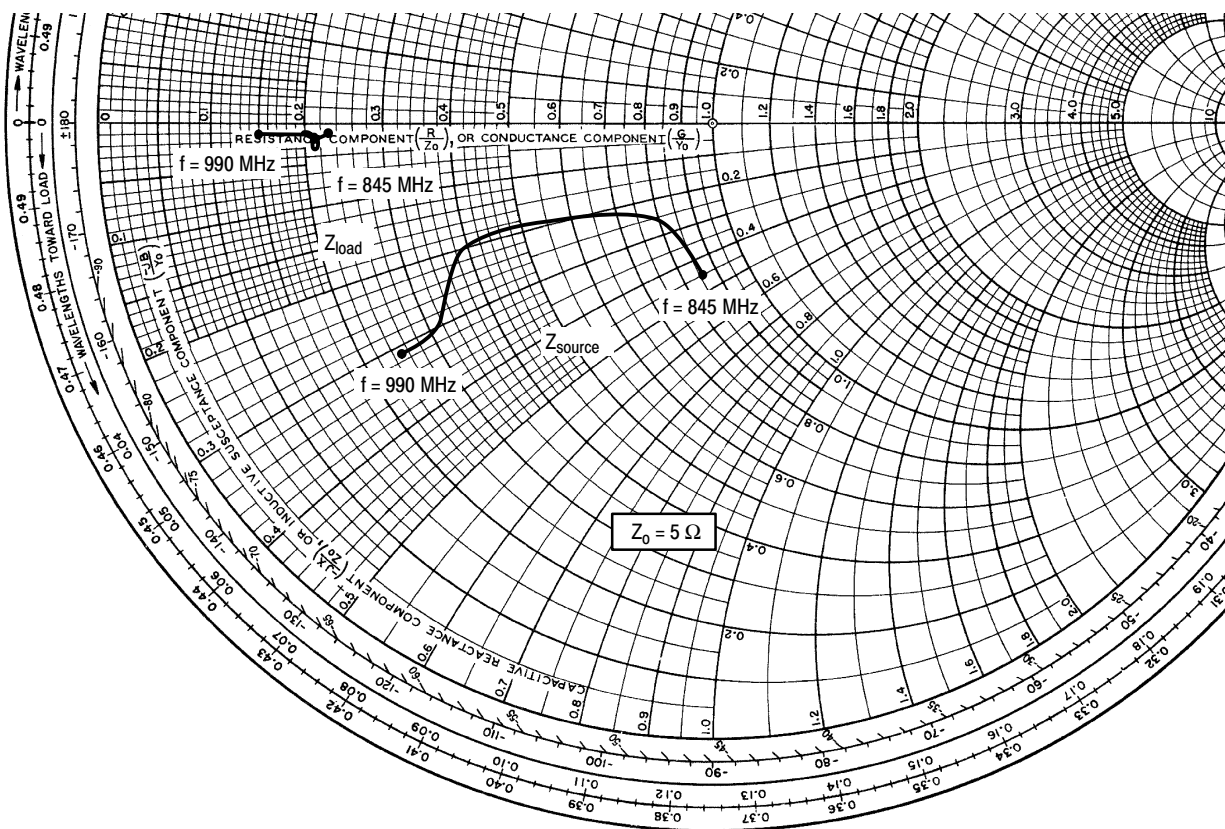


Figure 22. Spectral Regrowth at 600 kHz versus Output Power



$V_{DD} = 26 \text{ Vdc}$, $I_{DQ} = 700 \text{ mA}$, $P_{out} = 100 \text{ W CW}$

f MHz	Z_{source} Ω	Z_{load} Ω
845	$4.29 - j2.23$	$1.15 - j0.04$
865	$3.94 - j1.24$	$1.05 - j0.10$
890	$2.72 - j0.96$	$1.02 - j0.07$
920	$1.96 - j1.02$	$1.03 - j0.15$
960	$1.58 - j1.43$	$1.03 - j0.05$
990	$1.27 - j1.54$	$0.73 - j0.07$

Z_{source} = Test circuit impedance as measured from gate to ground.

Z_{load} = Test circuit impedance as measured from drain to ground.

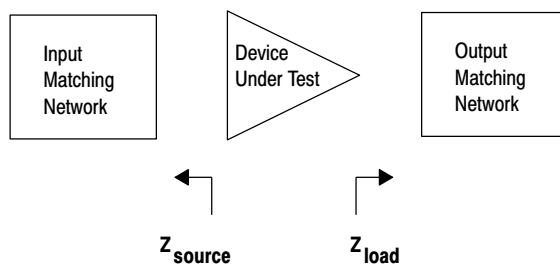
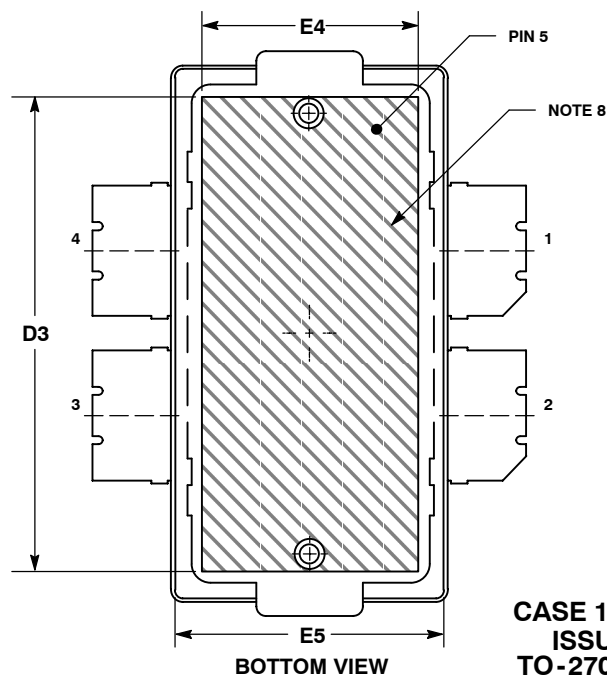
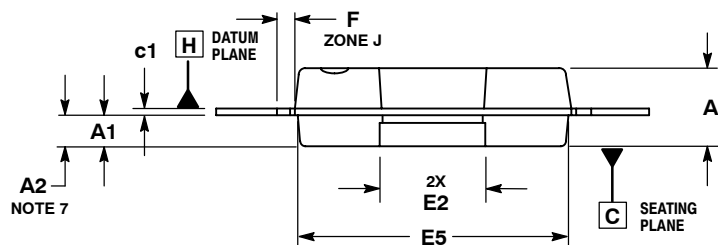
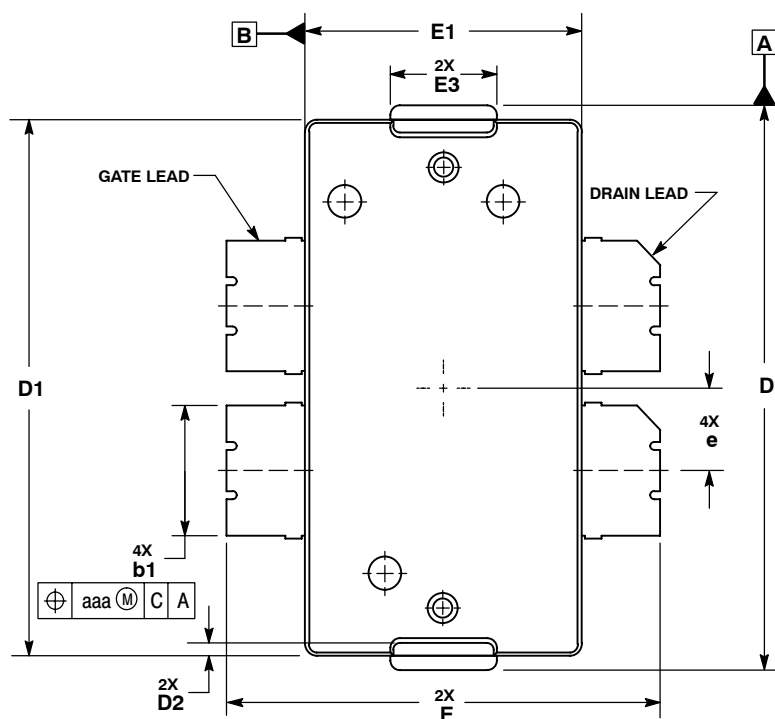


Figure 23. Series Equivalent Source and Load Impedance

NOTES

NOTES

PACKAGE DIMENSIONS



**CASE 1486-03
ISSUE C
TO-270 WB-4
PLASTIC
MRF5S9101MR1**

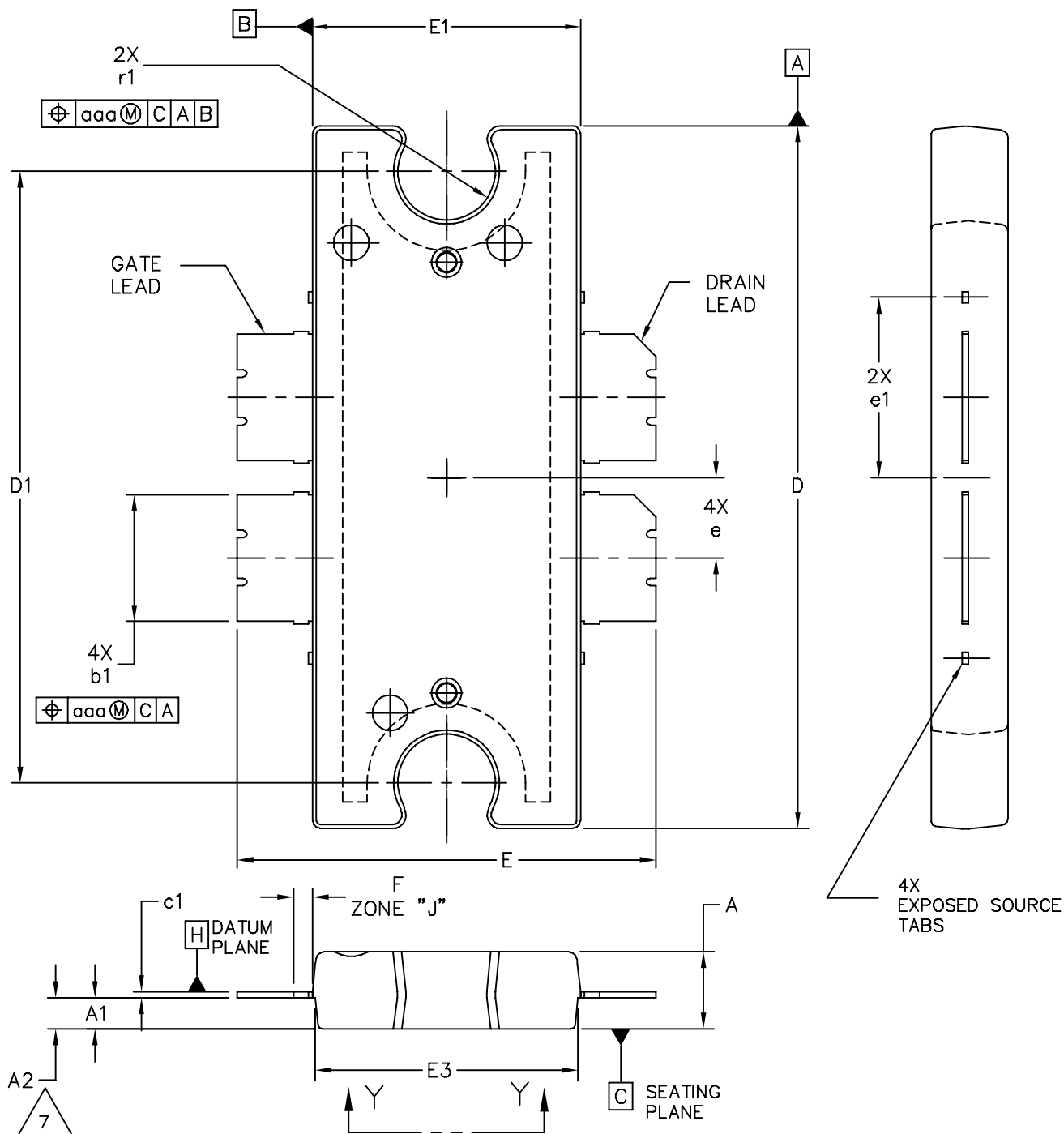
NOTES:

1. CONTROLLING DIMENSION: INCH.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE -H- IS LOCATED AT THE TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.
4. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 PER SIDE. DIMENSIONS "D" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-.
5. DIMENSION "b1" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 TOTAL IN EXCESS OF THE "b1" DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. DATUMS -A- AND -B- TO BE DETERMINED AT DATUM PLANE -H-.
7. DIMENSION A2 APPLIES WITHIN ZONE "J" ONLY.
8. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG.

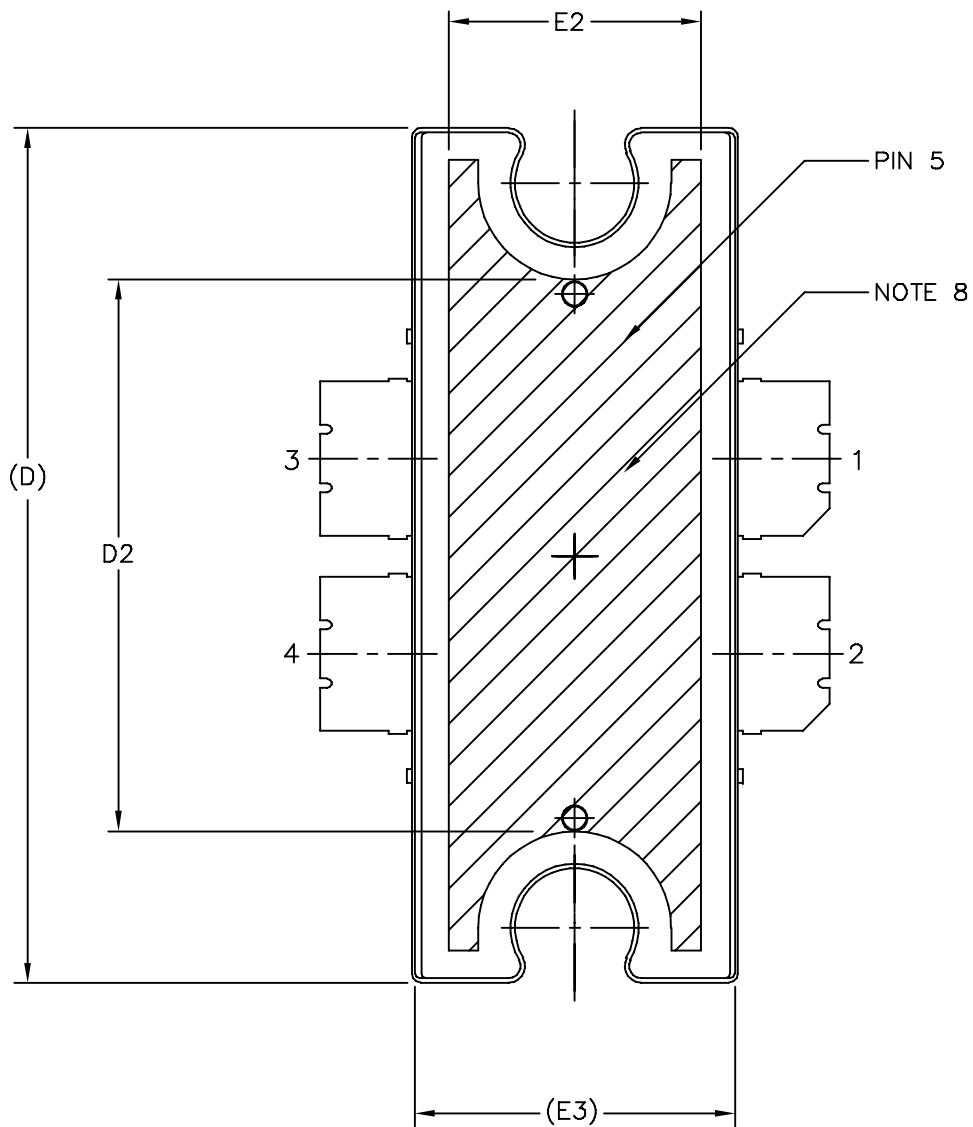
	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	.100	.104	2.54	2.64
A1	.039	.043	0.99	1.09
A2	.040	.042	1.02	1.07
D	.712	.720	18.08	18.29
D1	.688	.692	17.48	17.58
D2	.011	.019	0.28	0.48
D3	.600	---	15.24	---
E	.551	.559	.14	14.2
E1	.353	.357	8.97	9.07
E2	.132	.140	3.35	3.56
E3	.124	.132	3.15	3.35
E4	.270	---	6.86	---
E5	.346	.350	8.79	8.89
F	.025 BSC		0.64 BSC	
b1	.164	.170	4.17	4.32
c1	.007	.011	0.18	0.28
e	.106 BSC		2.69 BSC	
aaa	.004		0.10	

STYLE 1:

- PIN 1. DRAIN
2. DRAIN
3. GATE
4. GATE
5. SOURCE



© FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED.		MECHANICAL OUTLINE		PRINT VERSION NOT TO SCALE	
TITLE: TO-272 4 LEAD, WIDE BODY		DOCUMENT NO: 98ASA10575D		REV: D	
		CASE NUMBER: 1484-04		05 APR 2006	
		STANDARD: NON-JEDEC			



© FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED.		MECHANICAL OUTLINE		PRINT VERSION NOT TO SCALE	
TITLE: TO-272 4 LEAD, WIDE BODY			DOCUMENT NO: 98ASA10575D		REV: D
			CASE NUMBER: 1484-04		05 APR 2006
			STANDARD: NON-JEDEC		

NOTES:

1. CONTROLLING DIMENSION: INCH
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE H IS LOCATED AT THE TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.
4. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 PER SIDE. DIMENSIONS "D" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.
5. DIMENSIONS "b1" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 TOTAL IN EXCESS OF THE "b1" DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. DATUM A AND B TO BE DETERMINED AT DATUM PLANE H.
7. DIMENSION A2 APPLIES WITHIN ZONE "J" ONLY.
8. HATCHING REPRESENTS EXPOSED AREA OF THE HEAT SLUG. HATCHED AREA SHOWN IS ON THE SAME PLANE.

STYLE 1:

PIN 1 - DRAIN PIN 2 - DRAIN
PIN 3 - GATE PIN 4 - GATE
PIN 5 - SOURCE

DIM	INCH		MILLIMETER		DIM	INCH		MILLIMETER	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	.100	.104	2.54	2.64	b1	.164	.170	4.17	4.32
A1	.039	.043	0.99	1.09	c1	.007	.011	.18	.28
A2	.040	.042	1.02	1.07	r1	.063	.068	1.60	1.73
D	.928	.932	23.57	23.67	e	.106 BSC		2.69 BSC	
D1	.810 BSC		20.57 BSC		e1	.239 INFO ONLY		6.07 INFO ONLY	
D2	.600	---	15.24	---	aaa	.004		.10	
E	.551	.559	14	14.2					
E1	.353	.357	8.97	9.07					
E2	.270	---	6.86	---					
E3	.346	.350	8.79	8.89					
F	.025 BSC		0.64 BSC						
© FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED.			MECHANICAL OUTLINE			PRINT VERSION NOT TO SCALE			
TITLE: TO-272 4 LEAD WIDE BODY					DOCUMENT NO: 98ASA10575D			REV: D	
					CASE NUMBER: 1484-04			05 APR 2006	
					STANDARD: NON-JEDEC				

How to Reach Us:

Home Page:

www.freescale.com

E-mail:

support@freescale.com

USA/Europe or Locations Not Listed:

Freescale Semiconductor
Technical Information Center, CH370
1300 N. Alma School Road
Chandler, Arizona 85224
+1-800-521-6274 or +1-480-768-2130
support@freescale.com

Europe, Middle East, and Africa:

Freescale Halbleiter Deutschland GmbH
Technical Information Center
Schatzbogen 7
81829 Muenchen, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
support@freescale.com

Japan:

Freescale Semiconductor Japan Ltd.
Headquarters
ARCO Tower 15F
1-8-1, Shimo-Meguro, Meguro-ku,
Tokyo 153-0064
Japan
0120 191014 or +81 3 5437 9125
support.japan@freescale.com

Asia/Pacific:

Freescale Semiconductor Hong Kong Ltd.
Technical Information Center
2 Dai King Street
Tai Po Industrial Estate
Tai Po, N.T., Hong Kong
+800 2666 8080
support.asia@freescale.com

For Literature Requests Only:

Freescale Semiconductor Literature Distribution Center
P.O. Box 5405
Denver, Colorado 80217
1-800-441-2447 or 303-675-2140
Fax: 303-675-2150
LDCForFreescaleSemiconductor@hibbertgroup.com

Information in this document is provided solely to enable system and software implementers to use Freescale Semiconductor products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document.

Freescale Semiconductor reserves the right to make changes without further notice to any products herein. Freescale Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in Freescale Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals", must be validated for each customer application by customer's technical experts. Freescale Semiconductor does not convey any license under its patent rights nor the rights of others. Freescale Semiconductor products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale Semiconductor product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale Semiconductor was negligent regarding the design or manufacture of the part.

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners.
© Freescale Semiconductor, Inc. 2006. All rights reserved.

RoHS-compliant and/or Pb-free versions of Freescale products have the functionality and electrical characteristics of their non-RoHS-compliant and/or non-Pb-free counterparts. For further information, see <http://www.freescale.com> or contact your Freescale sales representative.

For information on Freescale's Environmental Products program, go to <http://www.freescale.com/epp>.

