

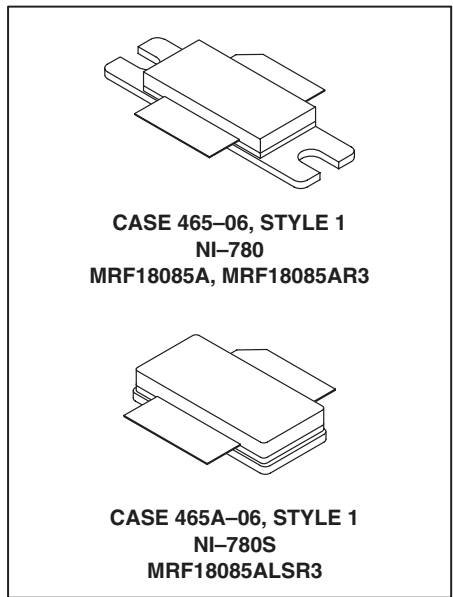
The RF MOSFET Line
RF Power Field Effect Transistors
N-Channel Enhancement-Mode Lateral MOSFETs

Designed for GSM and GSM EDGE base station applications with frequencies from 1.8 to 2.0 GHz. Suitable for TDMA, CDMA and multicarrier amplifier applications. To be used in Class AB for PCN-PCS/cellular radio and WLL applications. Specified for GSM-GSM EDGE 1805 – 1880 MHz.

- GSM and GSM EDGE Performance, Full Frequency Band (1805–1880 MHz)
Power Gain – 15 dB (Typ) @ 85 Watts CW
Efficiency – 52% (Typ) @ 85 Watts CW
- Internally Matched, Controlled Q, for Ease of Use
- High Gain, High Efficiency and High Linearity
- Integrated ESD Protection
- Designed for Maximum Gain and Insertion Phase Flatness
- Capable of Handling 5:1 VSWR, @ 26 Vdc, @ P1dB Output Power, @ f = 1805 MHz
- Excellent Thermal Stability
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Available in Tape and Reel. R3 Suffix = 250 Units per 56 mm, 13 inch Reel.
- Available with Low Gold Plating Thickness on Leads. L Suffix Indicates 40μ" Nominal.

MRF18085A
MRF18085AR3
MRF18085ALSR3

GSM/GSM EDGE
1.8 – 1.88 GHz, 85 W, 26 V
LATERAL N-CHANNEL
RF POWER MOSFETs



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	Vdc
Gate-Source Voltage	V_{GS}	-0.5, +15	Vdc
Total Device Dissipation @ $T_C = 25^\circ C$ Derate above 25°C	P_D	273 1.56	Watts W/°C
Storage Temperature Range	T_{stg}	-65 to +150	°C
Operating Junction Temperature	T_J	200	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.79	°C/W

ESD PROTECTION CHARACTERISTICS

Test Conditions	Class
Human Body Model	1 (Minimum)
Machine Model	M3 (Minimum)

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

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
----------------	--------	-----	-----	-----	------

OFF CHARACTERISTICS

Drain–Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = 100\ \mu\text{Adc}$)	$V_{(BR)DSS}$	65	—	—	Vdc
Zero Gate Voltage Drain Current ($V_{DS} = 26\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$)	I_{DSS}	—	—	10	μAdc
Gate–Source Leakage Current ($V_{GS} = 5\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	—	—	1	μAdc

ON CHARACTERISTICS

Gate Threshold Voltage ($V_{DS} = 10\text{ Vdc}$, $I_D = 200\ \mu\text{Adc}$)	$V_{GS(th)}$	2	—	4	Vdc
Gate Quiescent Voltage ($V_{DS} = 26\text{ Vdc}$, $I_D = 600\ \text{mAdc}$)	$V_{GS(Q)}$	2.5	3.9	4.5	Vdc
Drain–Source On–Voltage ($V_{GS} = 10\text{ Vdc}$, $I_D = 2\text{ Adc}$)	$V_{DS(on)}$	—	0.15	—	Vdc
Forward Transconductance ($V_{DS} = 10\text{ Vdc}$, $I_D = 2\text{ Adc}$)	g_{fs}	—	6.0	—	S

DYNAMIC CHARACTERISTICS

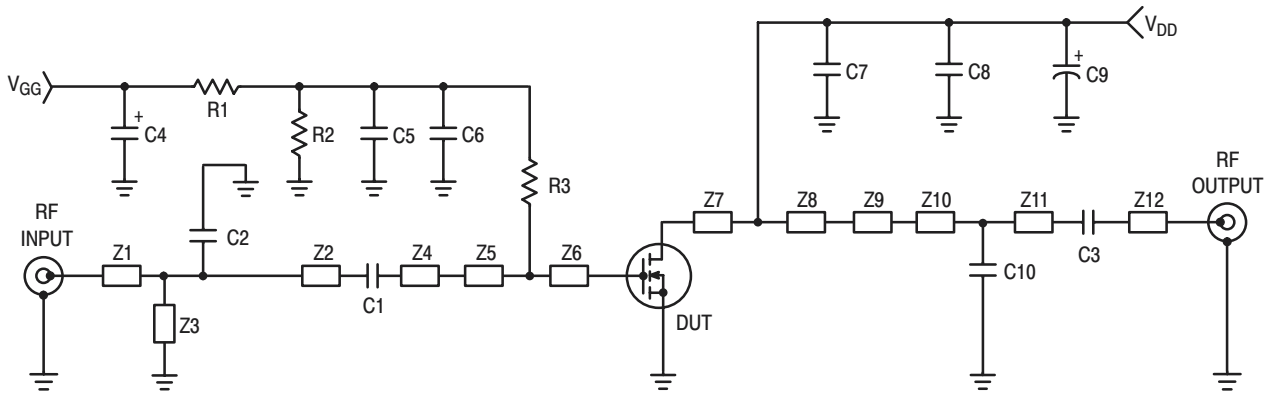
Reverse Transfer Capacitance (1) ($V_{DS} = 26\text{ Vdc}$, $V_{GS} = 0$, $f = 1\text{ MHz}$)	C_{rss}	—	3.6	—	pF
--	-----------	---	-----	---	----

FUNCTIONAL TESTS (In Motorola Test Fixture, 50 ohm system)

Common–Source Amplifier Power Gain @ 85 W (2) ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805 - 1880\text{ MHz}$)	G_{ps}	13.5	15	—	dB
Drain Efficiency @ 85 W (2) ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805 - 1880\text{ MHz}$)	η	48	52	—	%
Input Return Loss @ 85 W (2) ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805 - 1880\text{ MHz}$)	IRL	—	–12	–9	dB
Power Output, 1 dB Compression Point ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805 - 1880\text{ MHz}$)	P1dB	83	90	—	Watts
Output Mismatch Stress @ P1dB ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805\text{ MHz}$, VSWR = 5:1, All Phase Angles at Frequency of Tests)	Ψ	No Degradation In Output Power Before and After Test			

(1) Part is internally matched both on input and output.

(2) To meet application requirements, Motorola test fixtures have been designed to cover the full GSM1800 band, ensuring batch–to–batch consistency.



C1, C3, C6, C7	10 pF Chip Capacitors, B Case, ATC	Z4	0.610" x 0.118" Microstrip
C2	1.8 pF Chip Capacitor, B Case, ATC	Z5	0.331" x 1.153" Microstrip
C4	10 μ F, 35 V Tantalum Capacitor, AVX	Z6	0.063" x 1.153" Microstrip
C5, C8	1 nF Chip Capacitors, B Case, ATC	Z7	0.122" x 0.925" Microstrip
C9	220 μ F, 63 V Electrolytic Capacitor, Radial, Philips	Z8	0.547" x 0.925" Microstrip
C10	0.3 pF Chip Capacitor, B Case, ATC	Z9	0.394" x 0.177" Microstrip
R1, R2	10 k Ω , 1/4 W Chip Resistors (1206)	Z10	0.180" x 0.087" Microstrip
R3	1.0 k Ω , 1/4 W Chip Resistor (1206)	Z11	0.686" x 0.087" Microstrip
Z1	0.671" x 0.087" Microstrip	Z12	0.294" x 0.087" Microstrip
Z2	0.568" x 0.087" Microstrip	PCB	Taconic TLX8, 30 mils, $\epsilon_r = 2.55$
Z3	0.500" x 0.098" Microstrip Shorted Stub		

Figure 1. 1.80 – 1.88 GHz Test Fixture Schematic

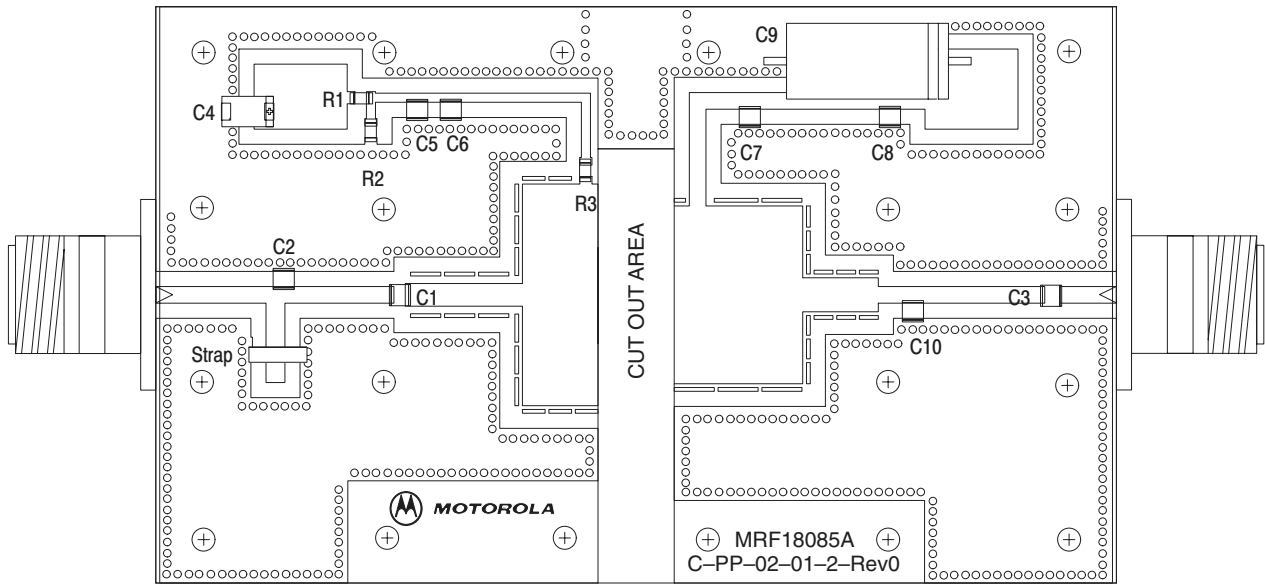


Figure 2. 1.80 – 1.88 GHz Test Fixture Component Layout

TYPICAL CHARACTERISTICS

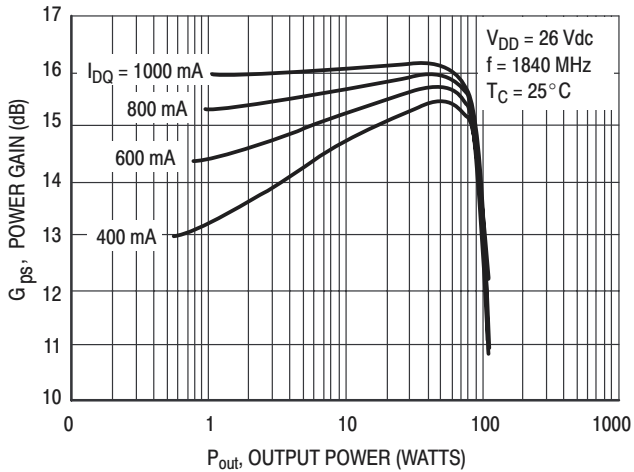


Figure 3. Power Gain versus Output Power

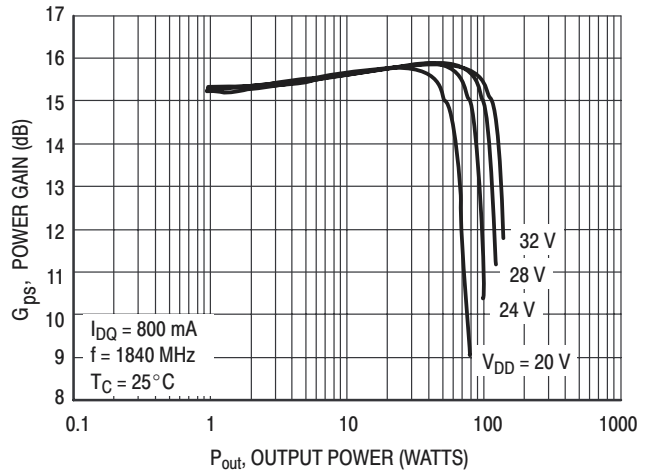


Figure 4. Power Gain versus Output Power

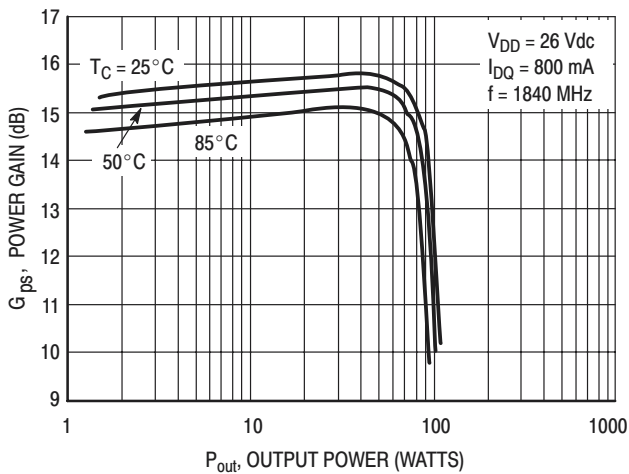


Figure 5. Power Gain versus Output Power

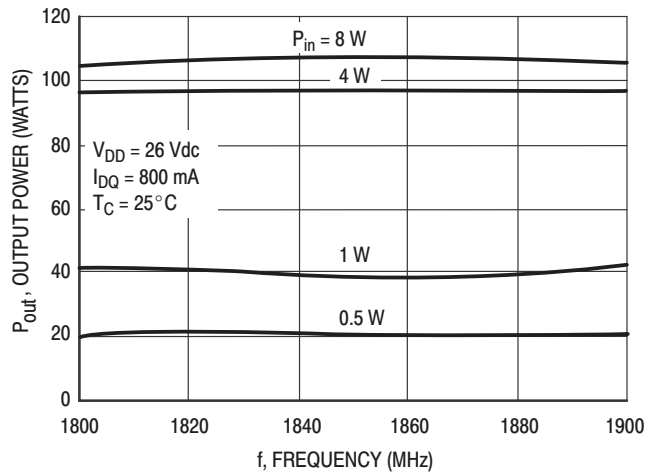


Figure 6. Output Power versus Frequency

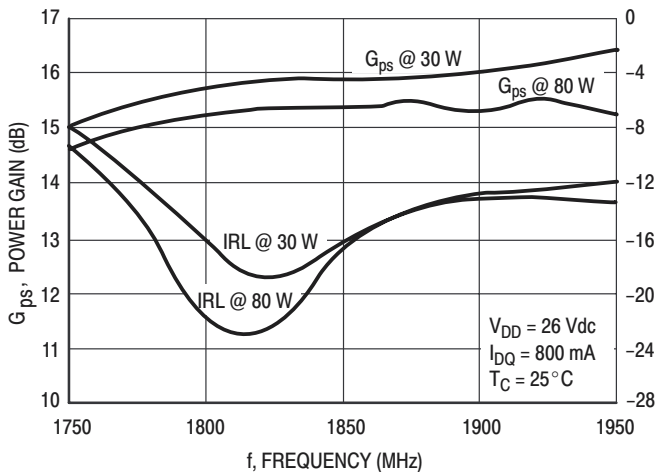


Figure 7. Power Gain versus Frequency

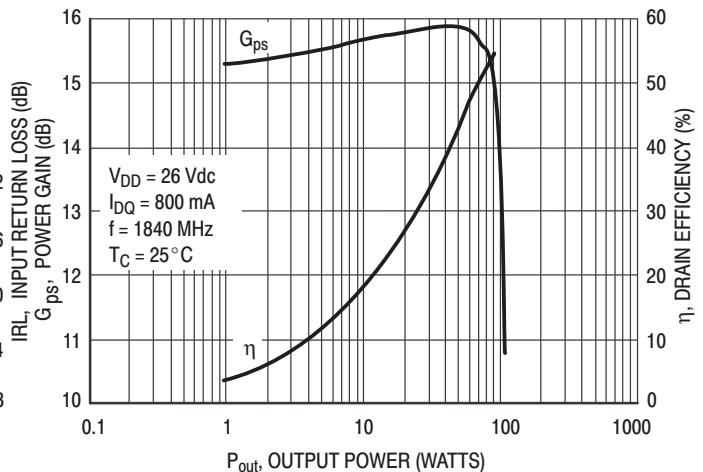
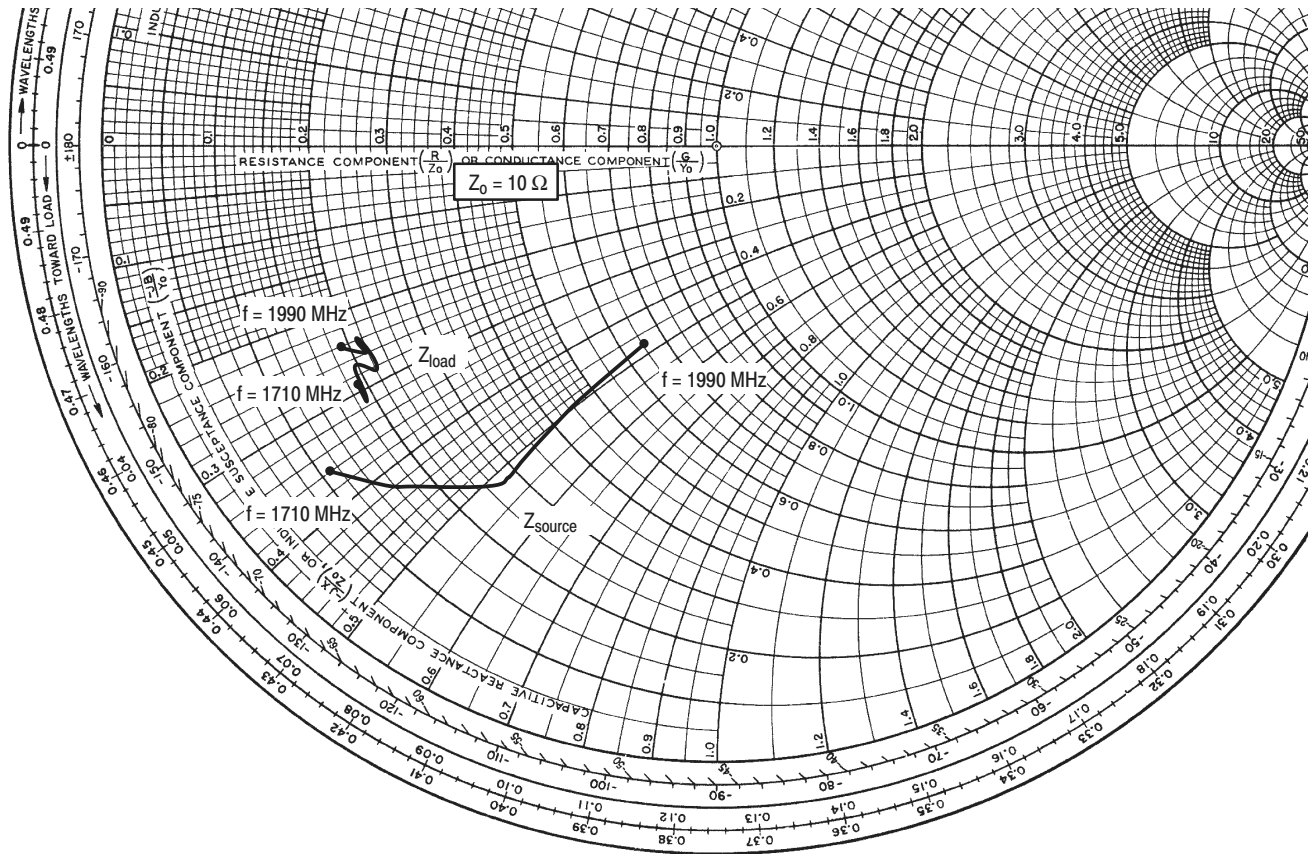


Figure 8. Power Gain and Efficiency versus Output Power



$V_{DD} = 26\text{ V}$, $I_{DQ} = 800\text{ mA}$, $P_{out} = 85\text{ W CW}$

f MHz	Z_{source} Ω	Z_{load} Ω
1710	$1.13 - j3.62$	$1.79 - j2.88$
1785	$1.61 - j4.23$	$1.82 - j3.15$
1805	$1.69 - j4.34$	$1.90 - j2.66$
1880	$2.83 - j5.25$	$2.09 - j2.77$
1930	$3.00 - j5.18$	$2.01 - j2.44$
1960	$4.39 - j4.97$	$2.01 - j2.57$
1990	$6.59 - j4.74$	$1.79 - j2.37$

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

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

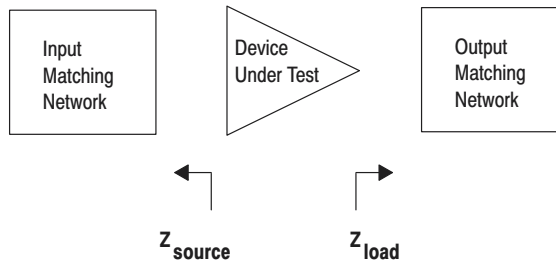
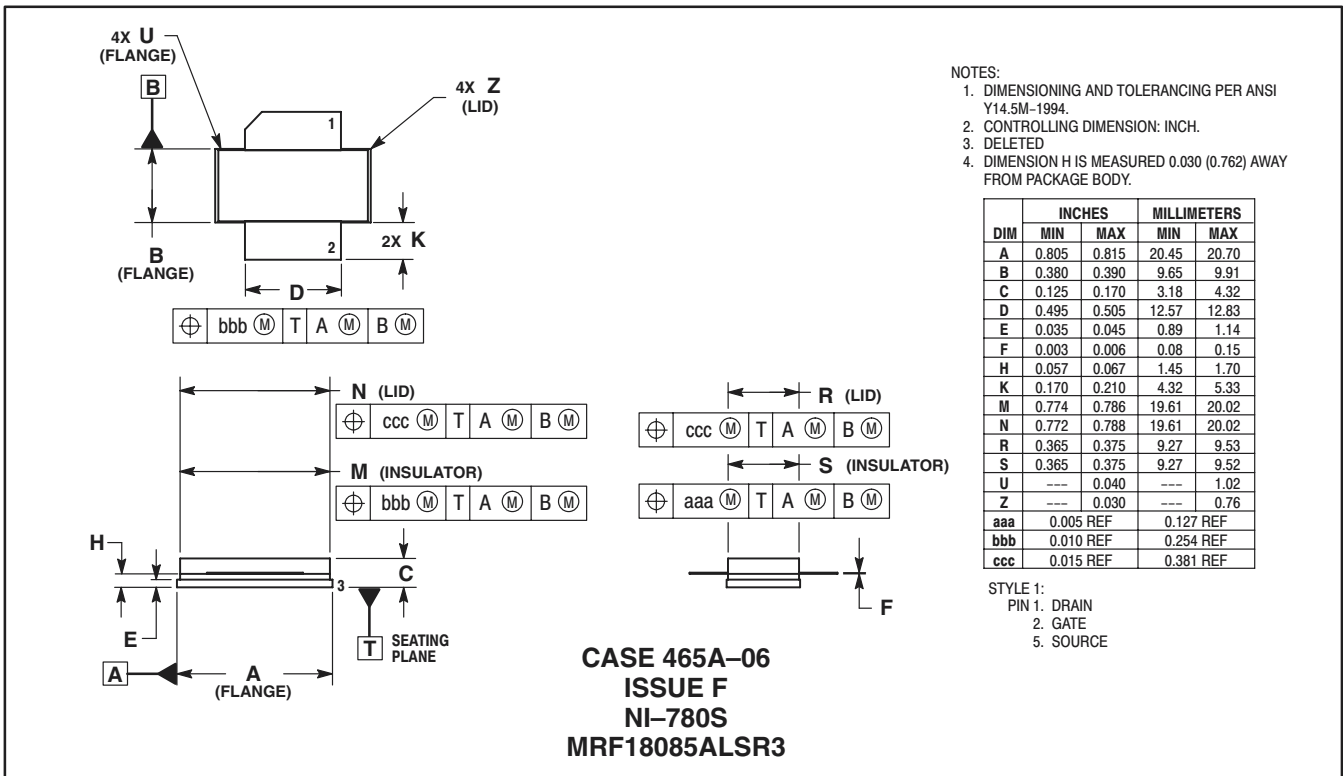
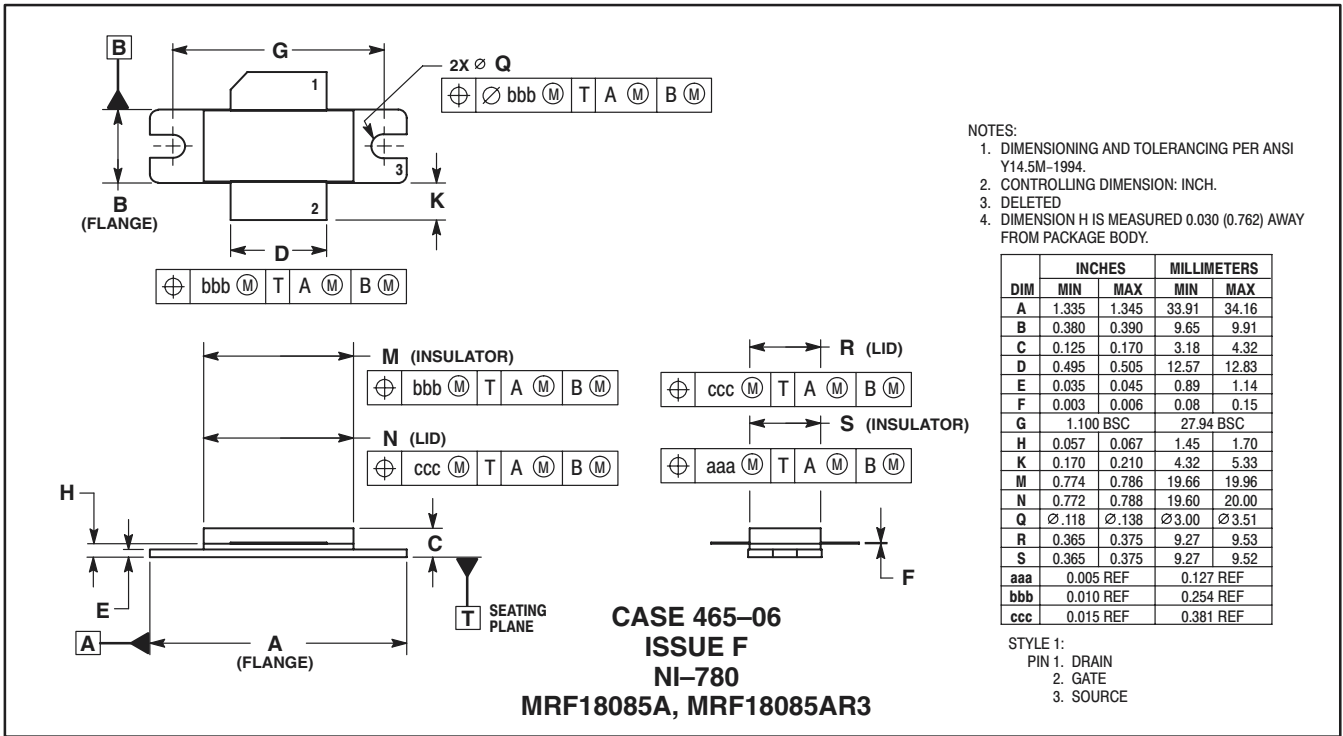


Figure 9. Series Equivalent Input and Output Impedance

NOTES

PACKAGE DIMENSIONS



Information in this document is provided solely to enable system and software implementers to use Motorola 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.

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola 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 Motorola 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. Motorola does not convey any license under its patent rights nor the rights of others. Motorola 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 Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola 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 Motorola was negligent regarding the design or manufacture of the part.

MOTOROLA and the Stylized M Logo are registered in the US Patent and Trademark Office. All other product or service names are the property of their respective owners. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

© Motorola Inc. 2003

HOW TO REACH US:

USA/EUROPE/LOCATIONS NOT LISTED:
Motorola Literature Distribution
P.O. Box 5405, Denver, Colorado 80217
1-800-521-6274 or 480-768-2130

JAPAN: Motorola Japan Ltd.; SPS, Technical Information Center,
3-20-1, Minami-Azabu, Minato-ku, Tokyo 106-8573, Japan
81-3-3440-3569

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; Silicon Harbour Centre,
2 Dai King Street, Tai Po Industrial Estate, Tai Po, N.T., Hong Kong
852-26668334

HOME PAGE: <http://motorola.com/semiconductors>



MOTOROLA



MRF18085A/D