

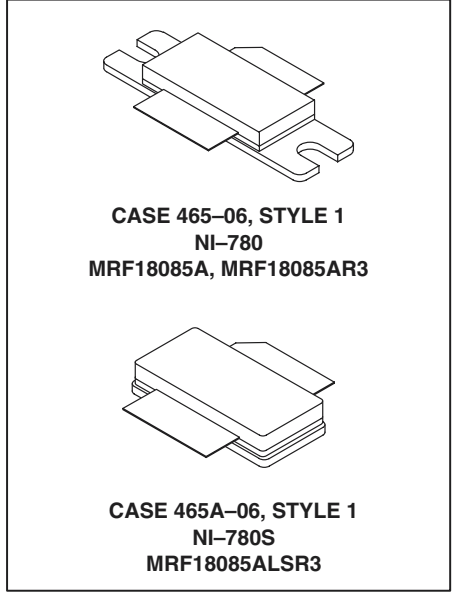
The RF MOSFET Line  
**RF Power Field Effect Transistors**  
N-Channel Enhancement-Mode Lateral MOSFETs

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 +200	°C
Operating Junction Temperature	$T_J$	200	°C

**THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.64	°C/W

**ESD PROTECTION CHARACTERISTICS**

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

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
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**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	$\mu\text{Adc}$
Gate–Source Leakage Current ( $V_{GS} = 5 \text{ Vdc}$ , $V_{DS} = 0 \text{ Vdc}$ )	$I_{GSS}$	—	—	1	$\mu\text{Adc}$

**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**

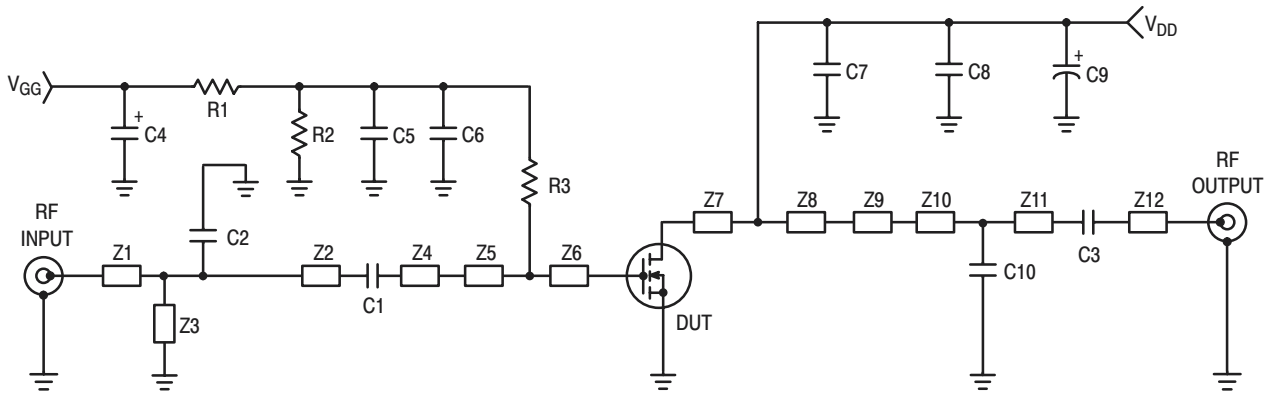
Reverse Transfer Capacitance (1) ( $V_{DS} = 26 \text{ Vdc}$ , $V_{GS} = 0$ , $f = 1 \text{ MHz}$ )	$C_{rss}$	—	3.6	—	pF
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**FUNCTIONAL TESTS** (In Motorola Test Fixture, 50 ohm system)

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) ( $V_{DD} = 26 \text{ Vdc}$ , $I_{DQ} = 800 \text{ mA}$ , $f = 1805 - 1880 \text{ MHz}$ )	$\eta$	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
$P_{out}$ , 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)	$\Psi$	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 $\mu$ 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 $\mu$ 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 $\Omega$ , 1/4 W Chip Resistors (1206)	Z10	0.180" x 0.087" Microstrip
R3	1.0 k $\Omega$ , 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, 0.8 mm Thickness
Z3	0.500" x 0.098" Microstrip Shorted Stub	Connectors	"N" Type, Macom 3052-1648-10

Figure 1. 1.80 – 1.88 GHz Test Fixture Schematic

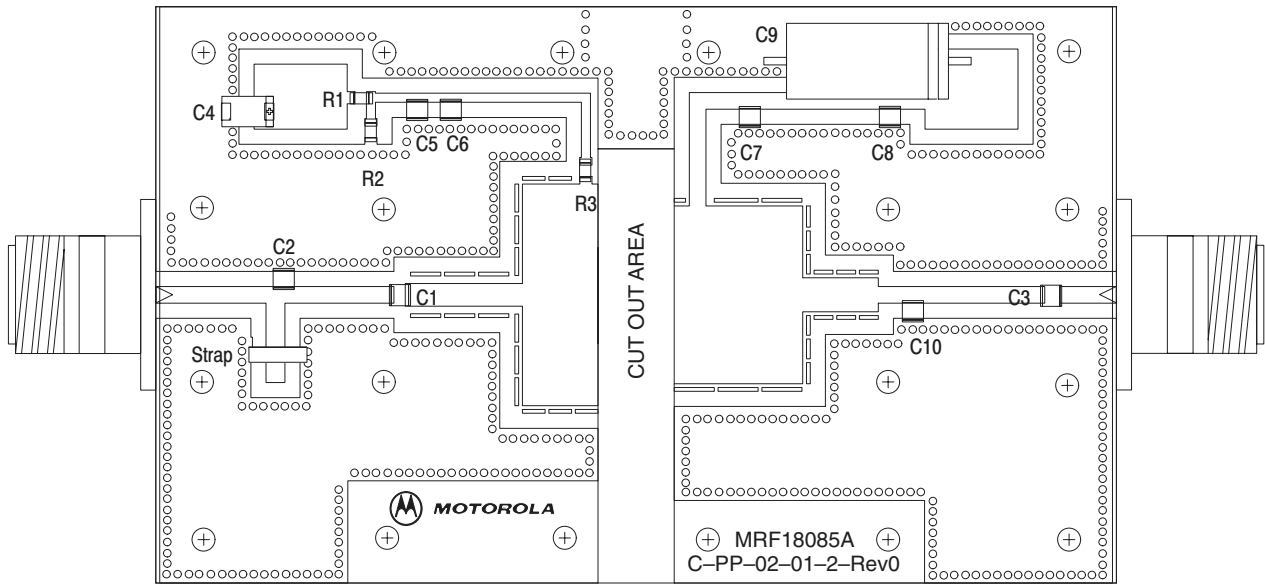


Figure 2. 1.80 – 1.88 GHz Test Fixture Component Layout

## TYPICAL CHARACTERISTICS

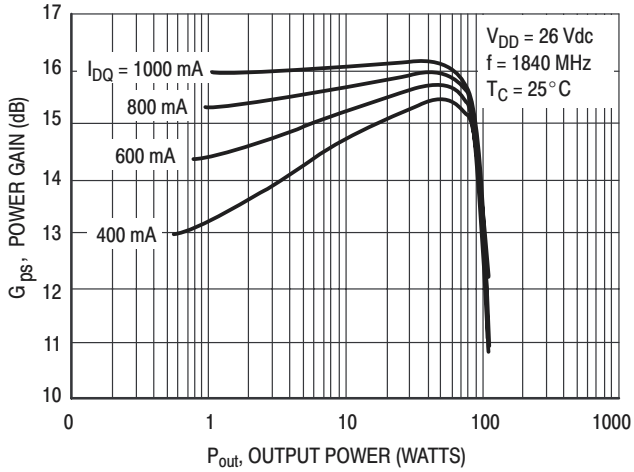


Figure 3. Power Gain versus Output Power

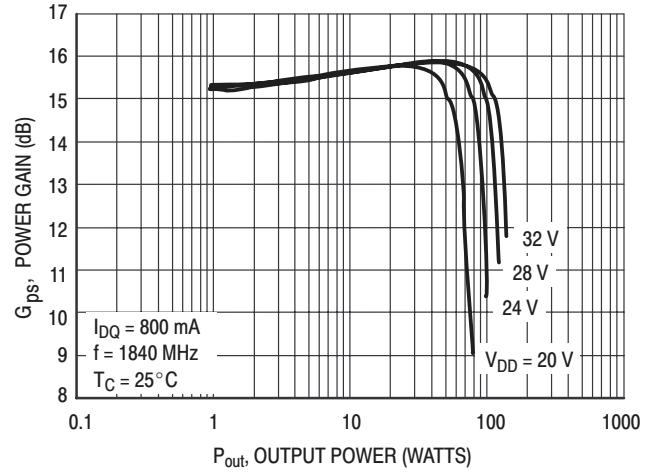


Figure 4. Power Gain versus Output Power

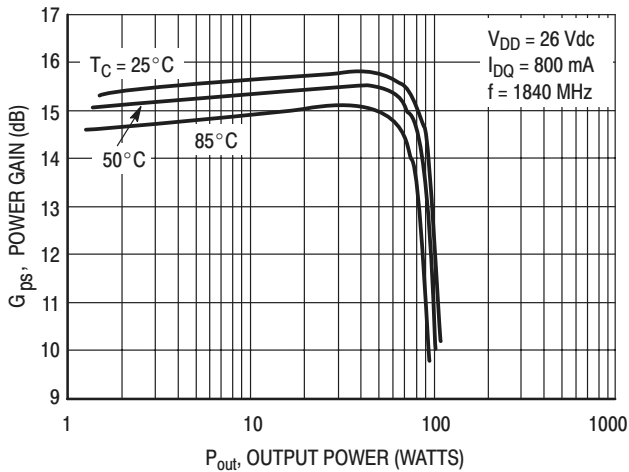


Figure 5. Power Gain versus Output Power

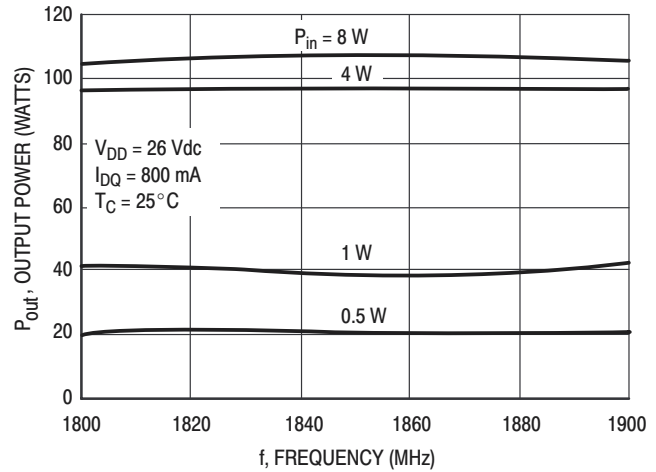


Figure 6. Output Power versus Frequency

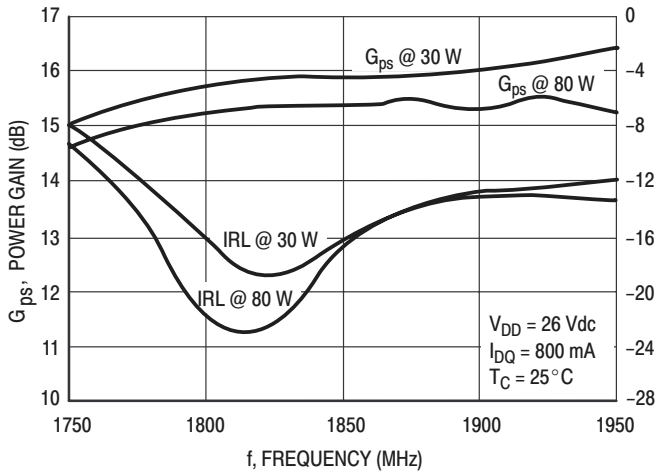


Figure 7. Power Gain versus Frequency

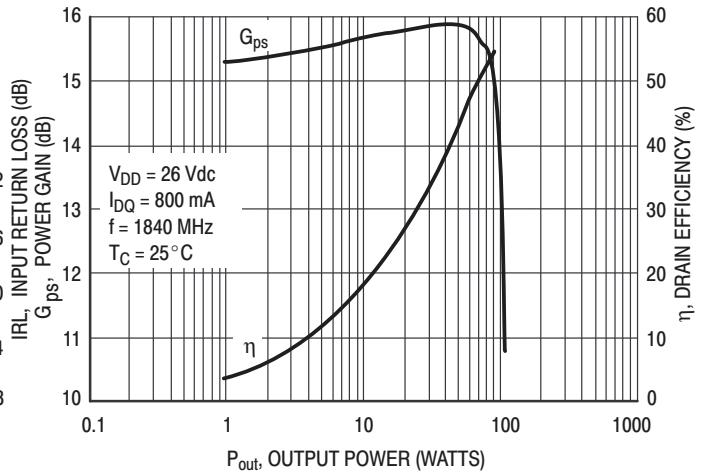
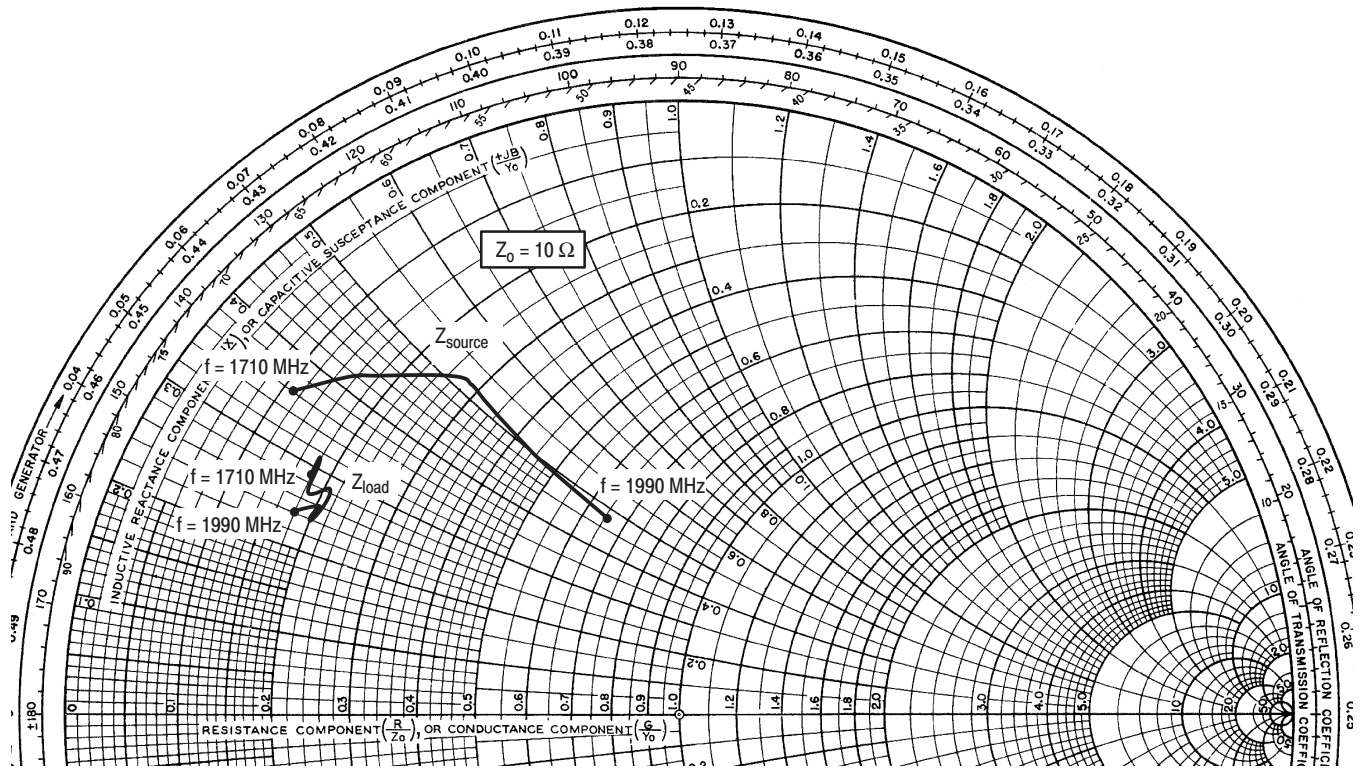


Figure 8. Power Gain and Efficiency versus Output Power



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

f MHz	$Z_{source}$ $\Omega$	$Z_{load}$ $\Omega$
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.

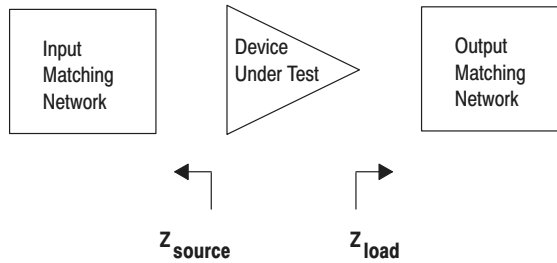
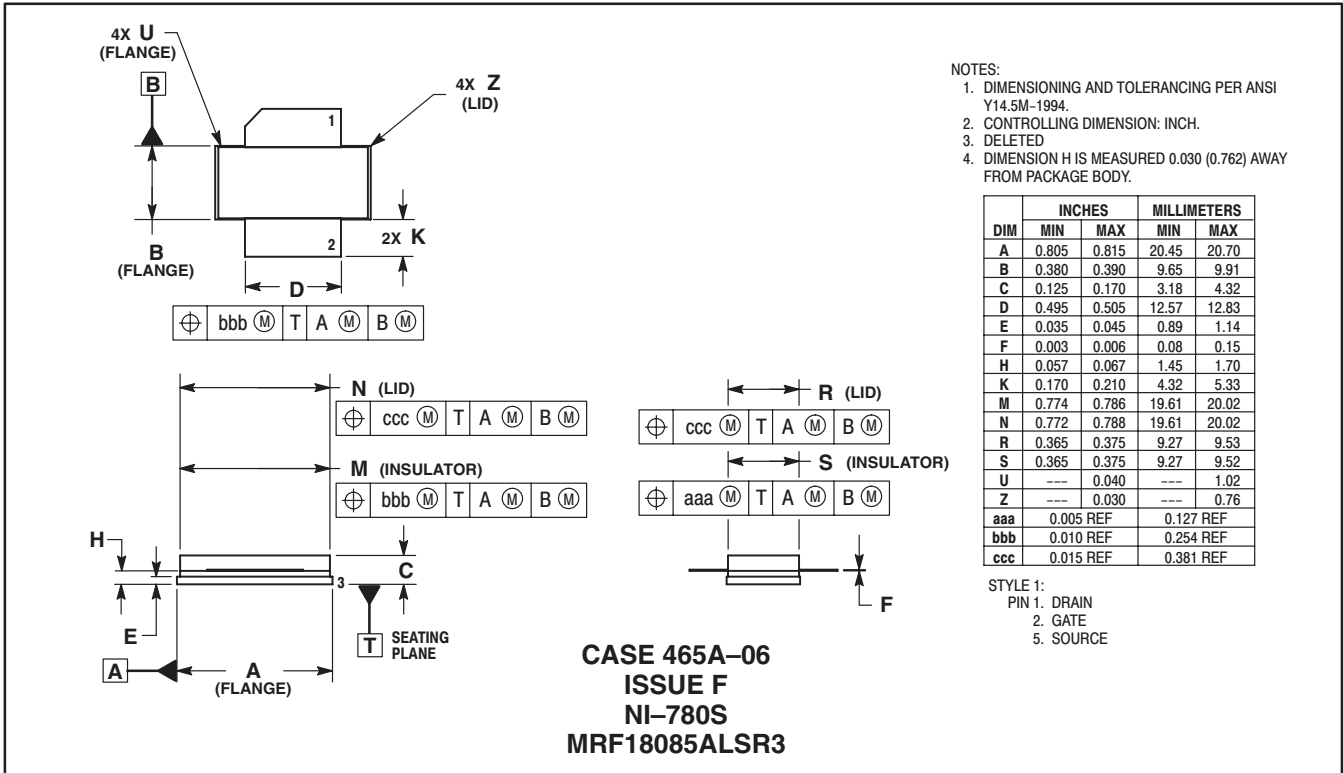
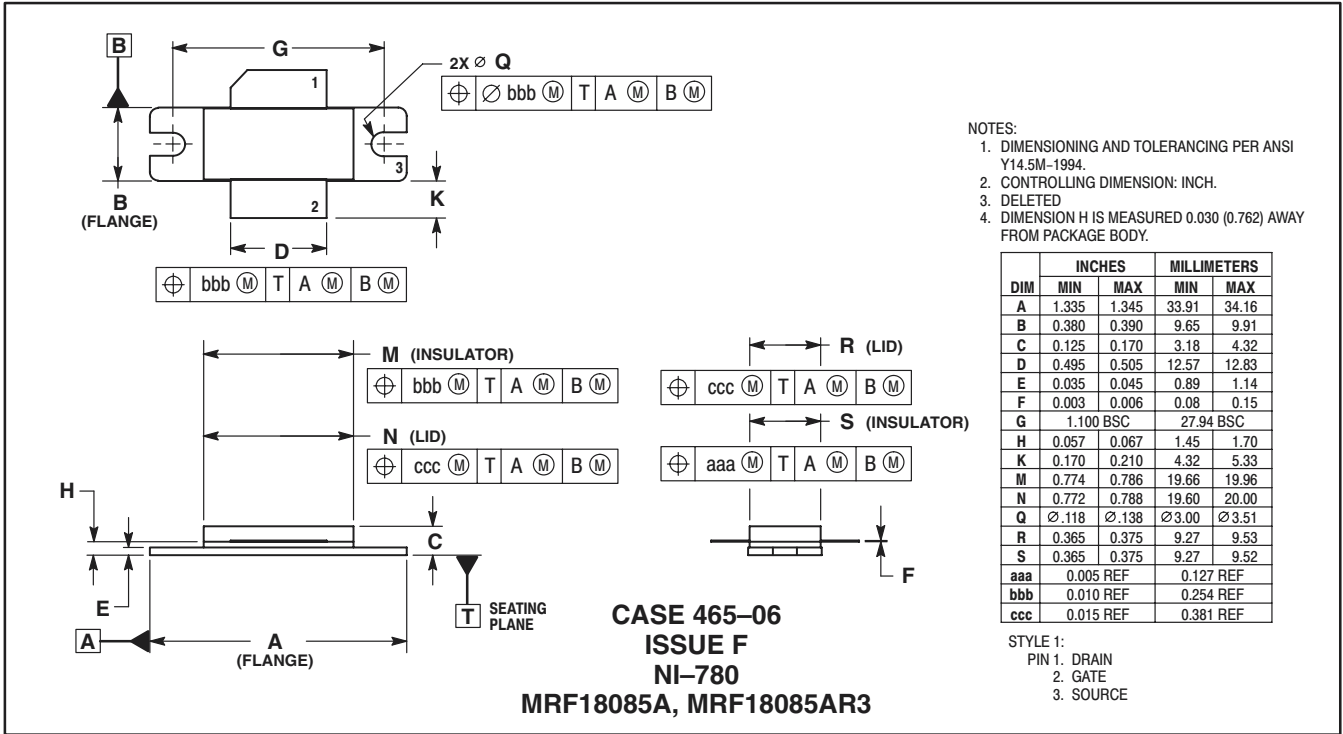


Figure 9. Series Equivalent Input and Output Impedance

# NOTES

## PACKAGE DIMENSIONS



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