

The RF MOSFET Line

RF Power Field Effect Transistors

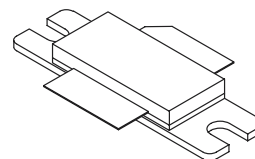
N-Channel Enhancement-Mode Lateral MOSFETs

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.

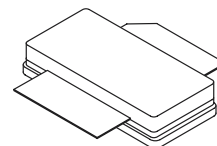
- GSM and GSM EDGE Performance, Full Frequency Band (1805–1880 MHz)
Power Gain – 15 dB (Typ) @ 85 Watts CW
Efficiency – 52% (Typ) @ 85 Watts CW
- Internally Matched, Controlled Q, for Ease of Use
- High Gain, High Efficiency and High Linearity
- Integrated ESD Protection
- Designed for Maximum Gain and 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



CASE 465-06, STYLE 1
NI-780
MRF18085A, MRF18085AR3



CASE 465A-06, STYLE 1
NI-780S
MRF18085ALSR3

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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	273 1.56	Watts W/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$
Operating Junction Temperature	T_J	200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

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)

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Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain–Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = 100\text{ }\mu\text{Adc}$)	$V_{(BR)DSS}$	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 ($V_{DS} = 10\text{ Vdc}$, $I_D = 200\text{ }\mu\text{Adc}$)	$V_{GS(th)}$	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

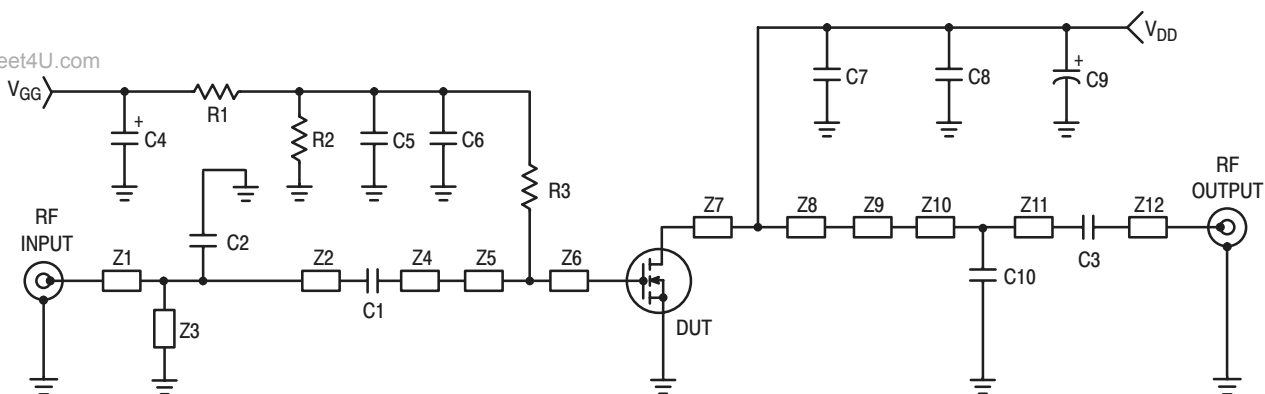
Reverse Transfer Capacitance (1) ($V_{DS} = 26\text{ Vdc}$, $V_{GS} = 0$, $f = 1\text{ MHz}$)	C_{rss}	—	3.6	—	pF
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FUNCTIONAL TESTS (In Motorola Test Fixture, 50 ohm system)

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) ($V_{DD} = 26\text{ Vdc}$, $I_{DQ} = 800\text{ mA}$, $f = 1805 - 1880\text{ MHz}$)	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
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)	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
C2	1.8 pF Chip Capacitor, B Case, ATC
C4	10 μ F, 35 V Tantalum Capacitor, AVX
C5, C8	1 nF Chip Capacitors, B Case, ATC
C9	220 μ F, 63 V Electrolytic Capacitor, Radial, Philips
C10	0.3 pF Chip Capacitor, B Case, ATC
R1, R2	10 k Ω , 1/4 W Chip Resistors (1206)
R3	1.0 k Ω , 1/4 W Chip Resistor (1206)
Z1	0.671" x 0.087" Microstrip
Z2	0.568" x 0.087" Microstrip
Z3	0.500" x 0.098" Microstrip Shorted Stub

Z4	0.610" x 0.118" Microstrip
Z5	0.331" x 1.153" Microstrip
Z6	0.063" x 1.153" Microstrip
Z7	0.122" x 0.925" Microstrip
Z8	0.547" x 0.925" Microstrip
Z9	0.394" x 0.177" Microstrip
Z10	0.180" x 0.087" Microstrip
Z11	0.686" x 0.087" Microstrip
Z12	0.294" x 0.087" Microstrip
PCB	Taconic TLX8, 0.8 mm Thickness
Connectors	"N" Type, Macom 3052-1648-10

Figure 1. 1.80 – 1.88 GHz Test Fixture Schematic

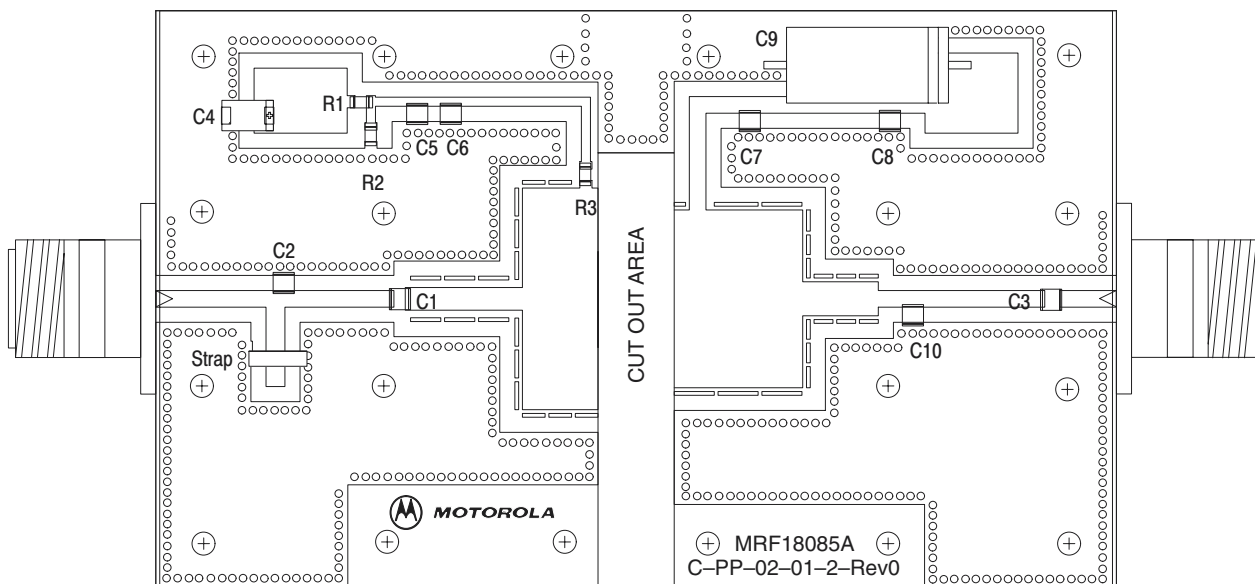


Figure 2. 1.80 – 1.88 GHz Test Fixture Component Layout

TYPICAL CHARACTERISTICS

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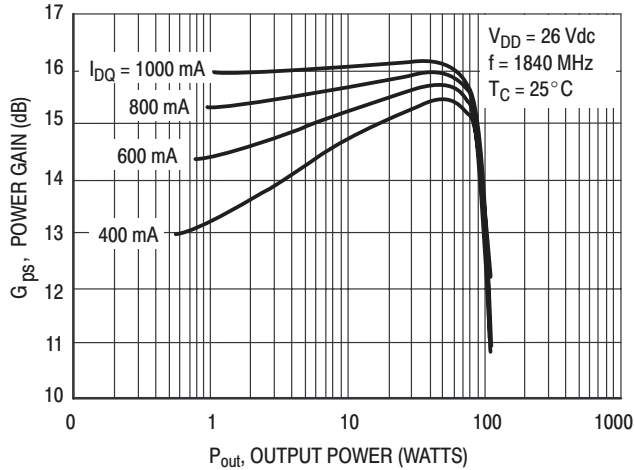


Figure 3. Power Gain versus Output Power

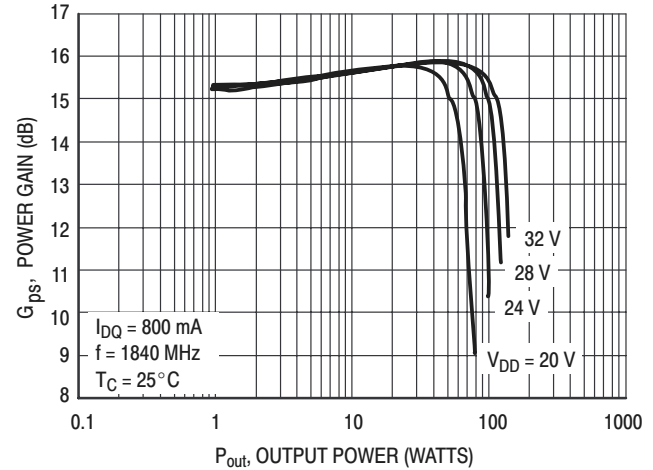


Figure 4. Power Gain versus Output Power

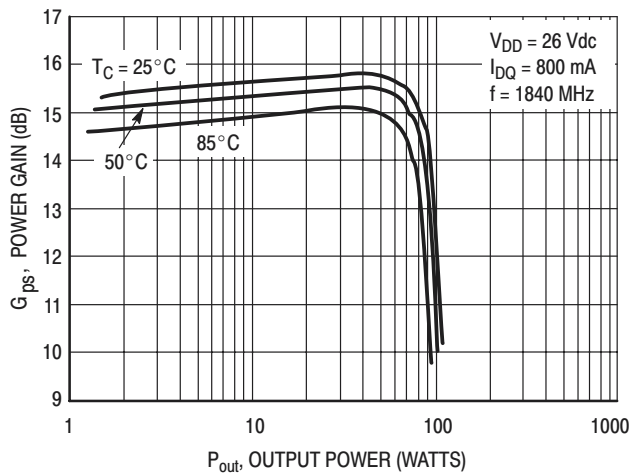


Figure 5. Power Gain versus Output Power

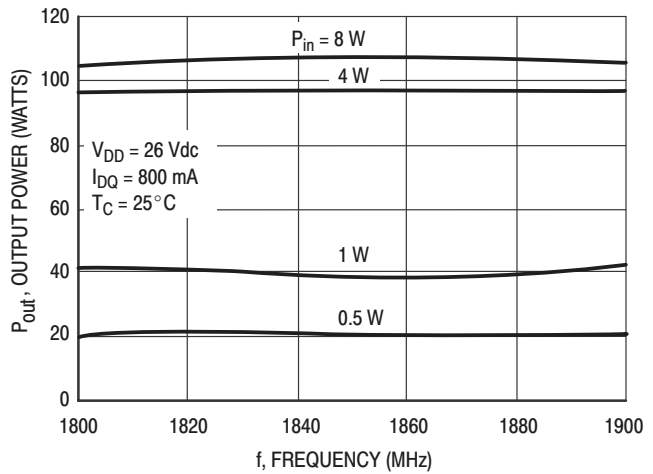


Figure 6. Output Power versus Frequency

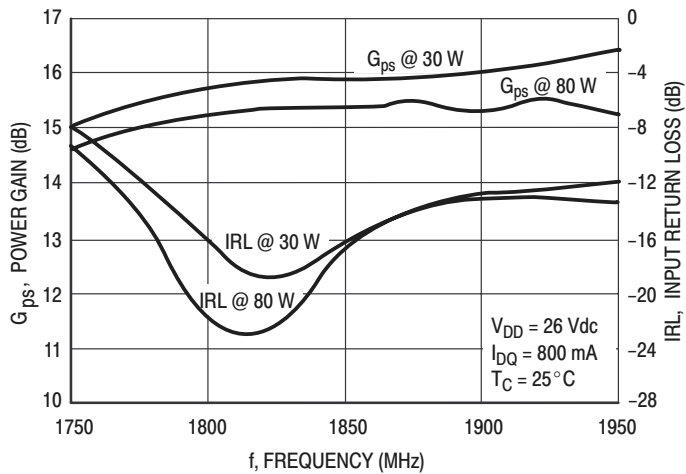


Figure 7. Power Gain versus Frequency

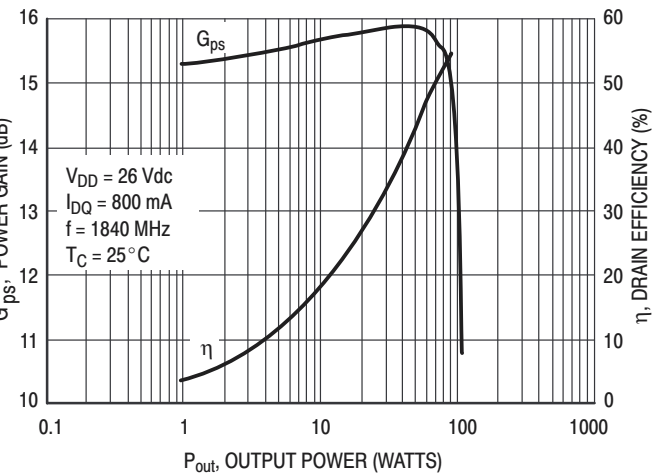
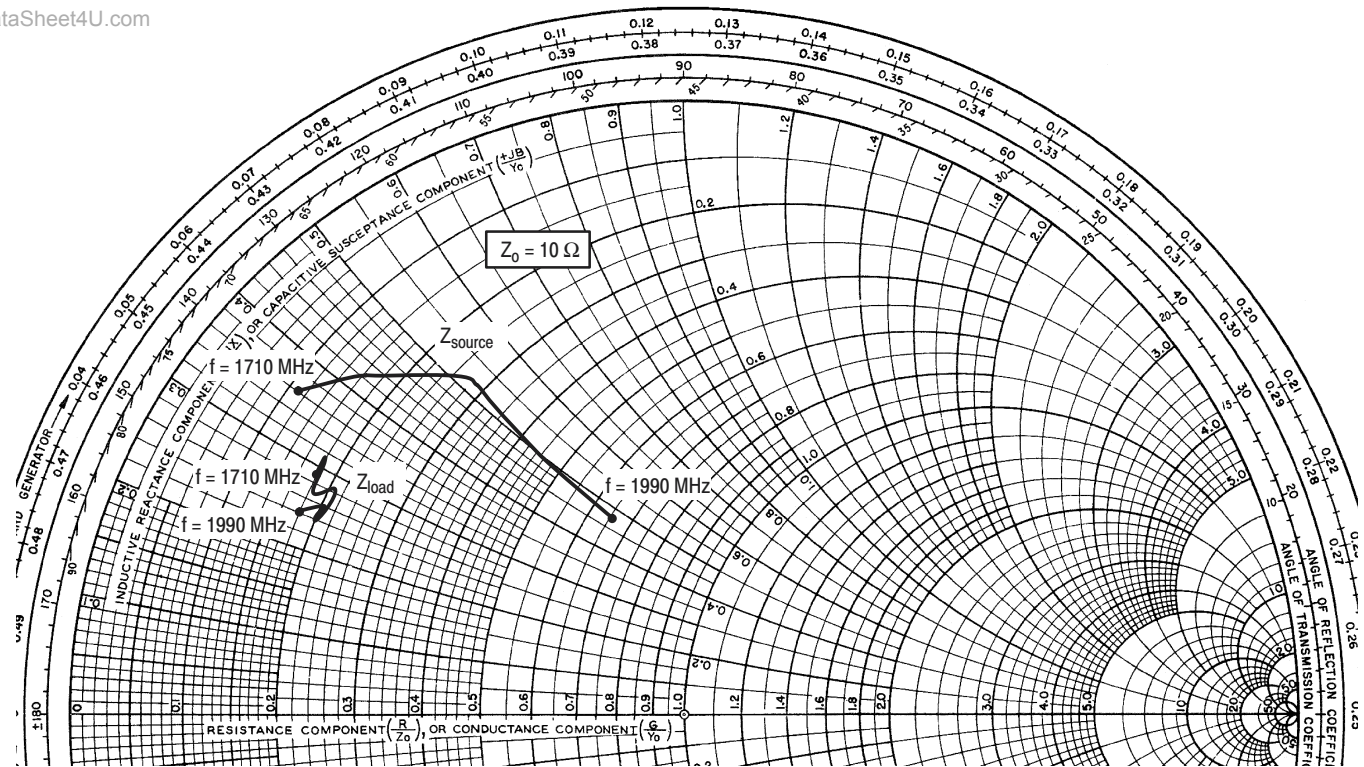


Figure 8. Power Gain and Efficiency versus Output Power



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

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.

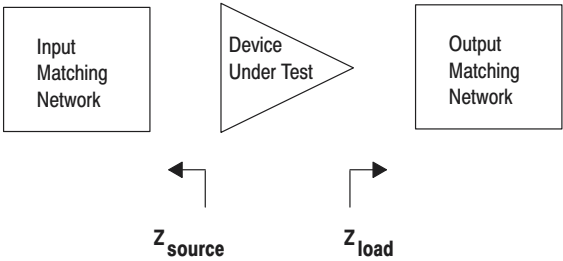
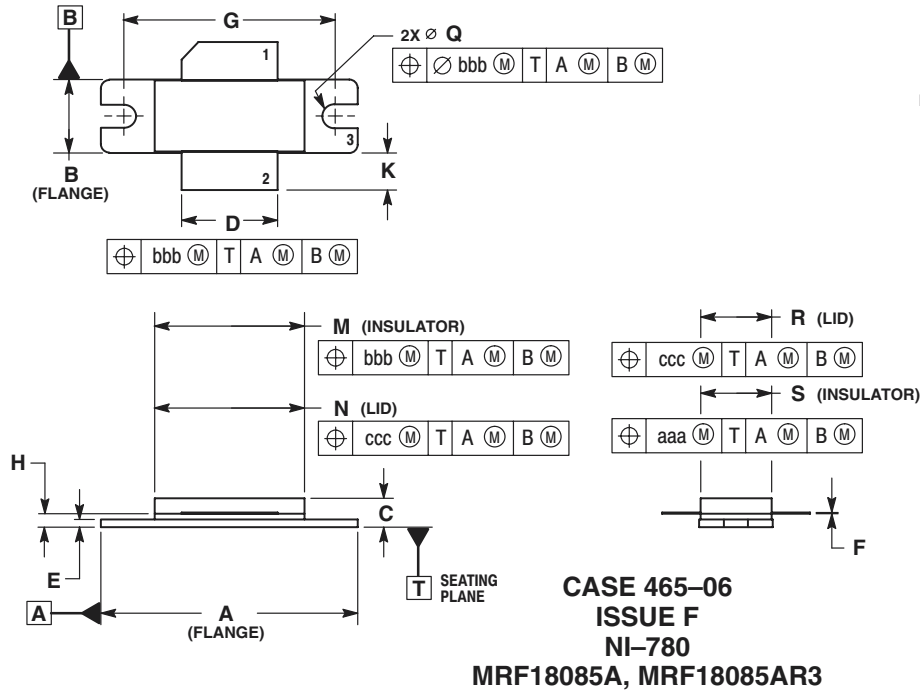


Figure 9. Series Equivalent Input and Output Impedance

NOTES

PACKAGE DIMENSIONS

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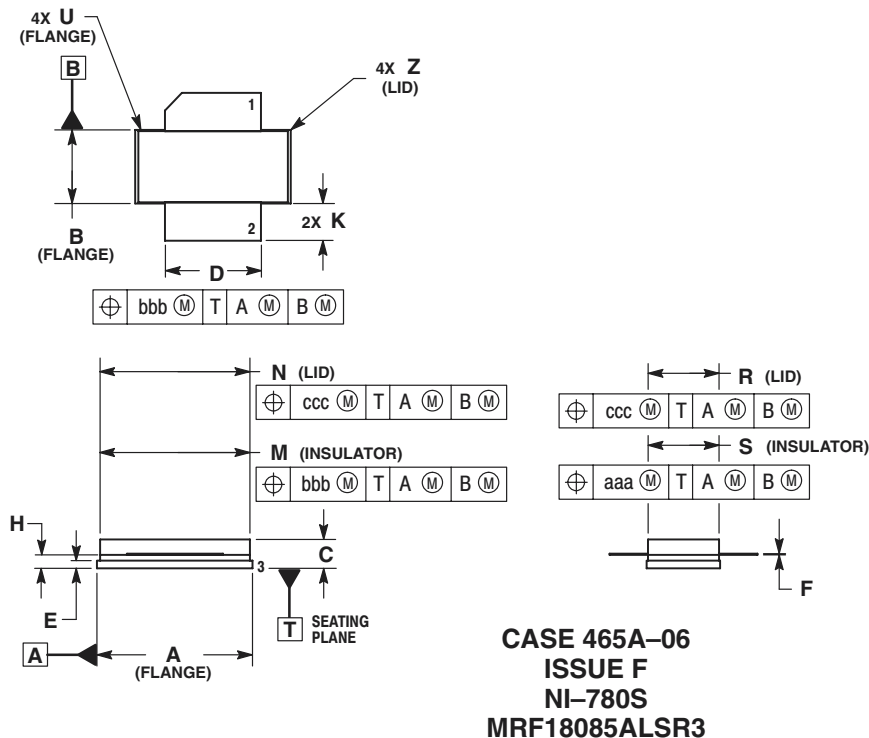
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DELETED
4. DIMENSION H IS MEASURED 0.030 (0.762) AWAY FROM PACKAGE BODY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.335	1.345	33.91	34.16
B	0.380	0.390	9.65	9.91
C	0.125	0.170	3.18	4.32
D	0.495	0.505	12.57	12.83
E	0.035	0.045	0.89	1.14
F	0.003	0.006	0.08	0.15
G	1.100	BSC	27.94	BSC
H	0.057	0.067	1.45	1.70
K	0.170	0.210	4.32	5.33
M	0.774	0.786	19.66	19.96
N	0.772	0.788	19.60	20.00
Q	$\varnothing$.118	$\varnothing$.138	$\varnothing$ 3.00	$\varnothing$ 3.51
R	0.365	0.375	9.27	9.53
S	0.365	0.375	9.27	9.52
aaa	0.005	REF	0.127	REF
bbb	0.010	REF	0.254	REF
ccc	0.015	REF	0.381	REF

STYLE 1:

- PIN 1. DRAIN
- GATE
- SOURCE



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3. DELETED
4. DIMENSION H IS MEASURED 0.030 (0.762) AWAY FROM PACKAGE BODY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.805	0.815	20.45	20.70
B	0.380	0.390	9.65	9.91
C	0.125	0.170	3.18	4.32
D	0.495	0.505	12.57	12.83
E	0.035	0.045	0.89	1.14
F	0.003	0.006	0.08	0.15
H	0.057	0.067	1.45	1.70
K	0.170	0.210	4.32	5.33
M	0.774	0.786	19.61	20.02
N	0.772	0.788	19.61	20.02
R	0.365	0.375	9.27	9.53
S	0.365	0.375	9.27	9.52
U	---	0.040	---	1.02
Z	---	0.030	---	0.76
aaa	0.005	REF	0.127	REF
bbb	0.010	REF	0.254	REF
ccc	0.015	REF	0.381	REF

STYLE 1:

- PIN 1. DRAIN
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- SOURCE

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