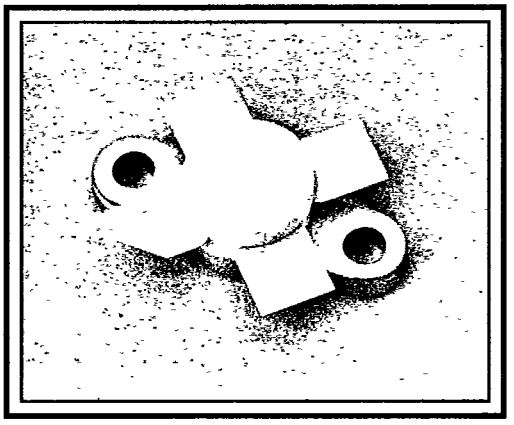
N-CHANNEL RF POWER MOSFET
DU1215S

M/A-COM PHI, INC.

FEATURES

- UNIQUE NEW MOSFET STRUCTURE
- LOWER CAPACITANCES FOR BROADBAND OPERATION
- HIGH SATURATED OUTPUT POWER
- LOWER NOISE FIGURE THAN BIPOLAR DEVICES
- SPECIFICALLY DESIGNED FOR 12 VOLT APPLICATIONS



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{ds}	40	V_{dc}
Gate-Source Voltage	V_{gs}	20	V_{dc}
Drain-Source Current	I_{ds}	4	A
Device Dissipation @ 25°C	P_d	88	W
Junction Temperature	T_j	200	°C
Storage Temperature	T_{stg}	−65 to 150°	°C
Dissipation Derating Above 25°C		.5	W/°C

ELECTRICAL CHARACTERISTICS AT 25°C

Parameter	Symbol	Min.	Max.	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{dss}	40		V_{dc}	$V_{gs}=0V$, $I_{ds}=5$ mA
Drain-Source Leakage Current	I_{dss}		1	mA	$V_{gs}=0V$, $V_{ds}=15V$
Gate-Source Leakage Current	I_{gss}		1	μA	$V_{gs}=20V$, $V_{ds}=0V$
Gate-Source Threshold Voltage	$V_{gs(th)}$	2	6	V	$V_{ds}=10V$, $I_{ds}=100$ mA
Forward Transconductance	g_m	500		mho	$V_{ds}=10V$, $I_{ds}=1A$, $\Delta V_{gs}=1V$
Input Capacitance	C_{iss}		35	pF	$V_{ds}=12V$, $V_{gs}=0V$, f=1 MHz
Reverse Capacitance	C_{rss}		12	pF	$V_{ds}=12V$, $V_{gs}=0V$, f=1 MHz
Output Capacitance	C_{oss}		45	pF	$V_{ds}=12V$, $V_{gs}=0V$, f=1 MHz
Power Gain	P_G	9.5		dB	$V_{ds}=12V$, $I_{dq}=.1A$, f=175 MHz, $P_O=15W$
Input Return Loss	R_L	10		dB	$V_{ds}=12V$, $I_{dq}=.1A$, f=175 MHz, $P_O=15W$
Drain Efficiency	η	60		%	$V_{ds}=12V$, $I_{dq}=.1A$, f=175 MHz, $P_O=15W$
VSWR	Ψ		20:1	——	$V_{ds}=12V$, $I_{dq}=.1A$, f=175 MHz, $P_O=15W$
Thermal Resistance	θ_{jc}		2.0	°C/W	$V_{ds}=12V$, $I_{dq}=.1A$, f=175 MHz, $P_O=15W$, $T_F=50°C$

FIGURE 1. Typical Efficiency vs. Frequency

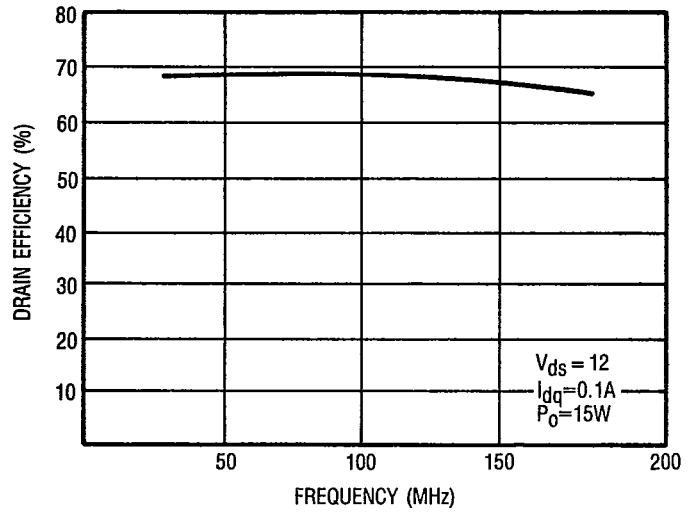


FIGURE 2. Typical Gain vs. Frequency

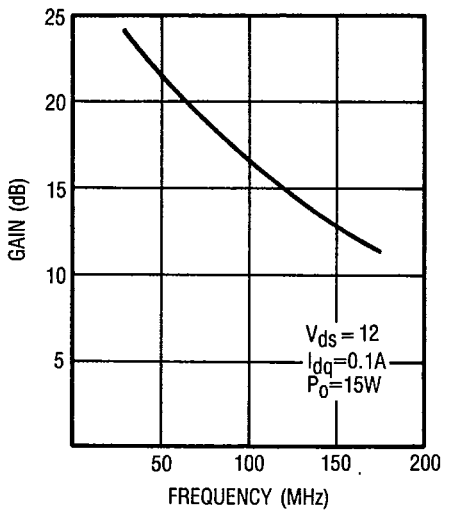


FIGURE 3. Typical Power Out vs. Power In

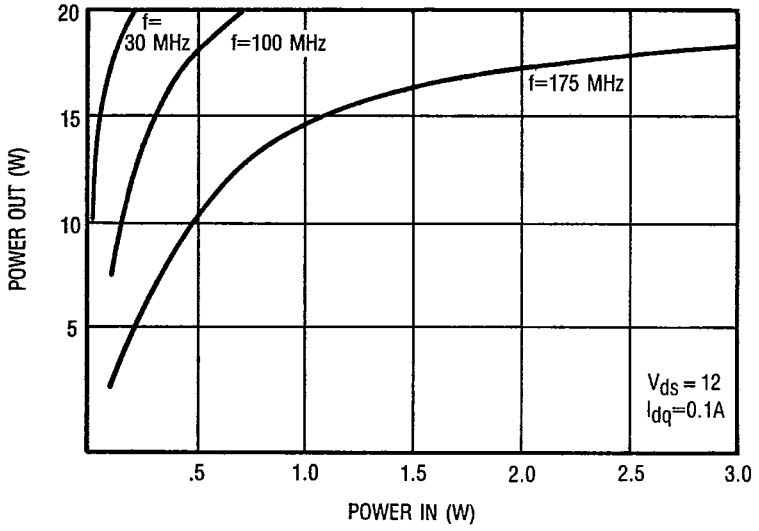


FIGURE 4. Typical Power Out vs. Supply Voltage

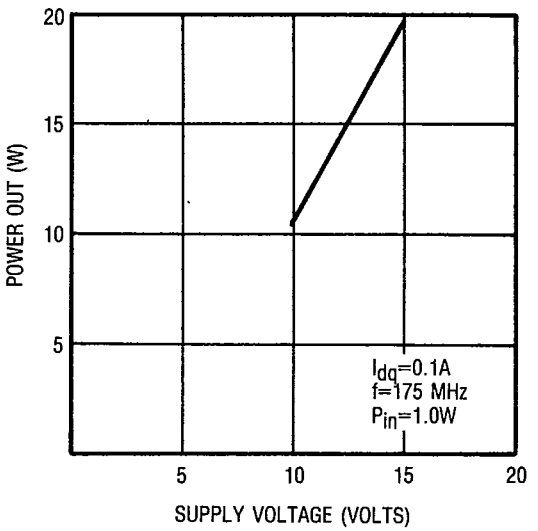


FIGURE 5. 175 MHz Test Fixture

PARTS LIST

C_1, C_8	ARCO #462 TRIMMER CAPACITORS, 5-80 pF
C_2, C_7	ARCO #422 TRIMMER CAPACITORS, 4-40 pF
C_3	SEMCO 30 pF CAPACITOR
C_4, C_5	0.001 μF FEED-THRU CAPACITORS
C_6	SEMCO 30 pF CAPACITORS
C_9	SEMCO 1000 pF
C_{10}	.01 μF MONOLITHIC CERAMIC
C_{11}	50 μF, 50V, ELECTROLYTIC
L_1, L_3	1" LENGTH OF #12 AWG COPPER WIRE
L_2	8 TURNS OF #20 AWG ENAMELED WIRE ON 1/4" DIAMETER, CLOSE WOUND
L_4	12 TURNS OF #20 AWG ON 0.25" ID, CLOSE WOUND.

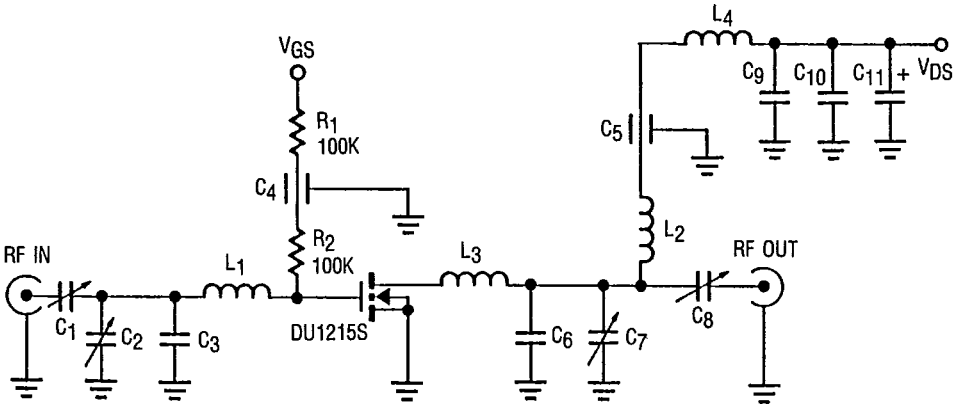
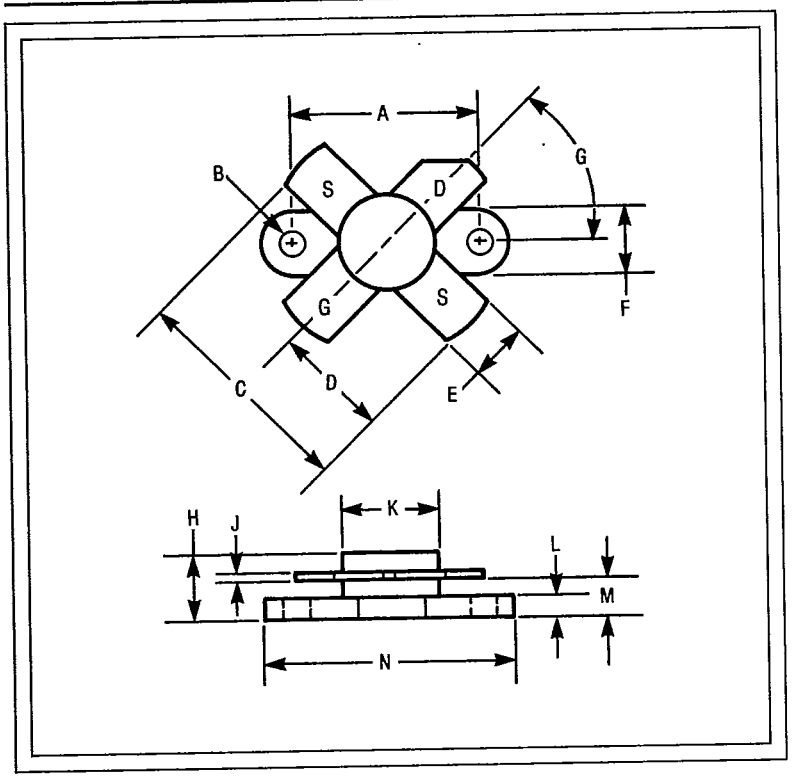
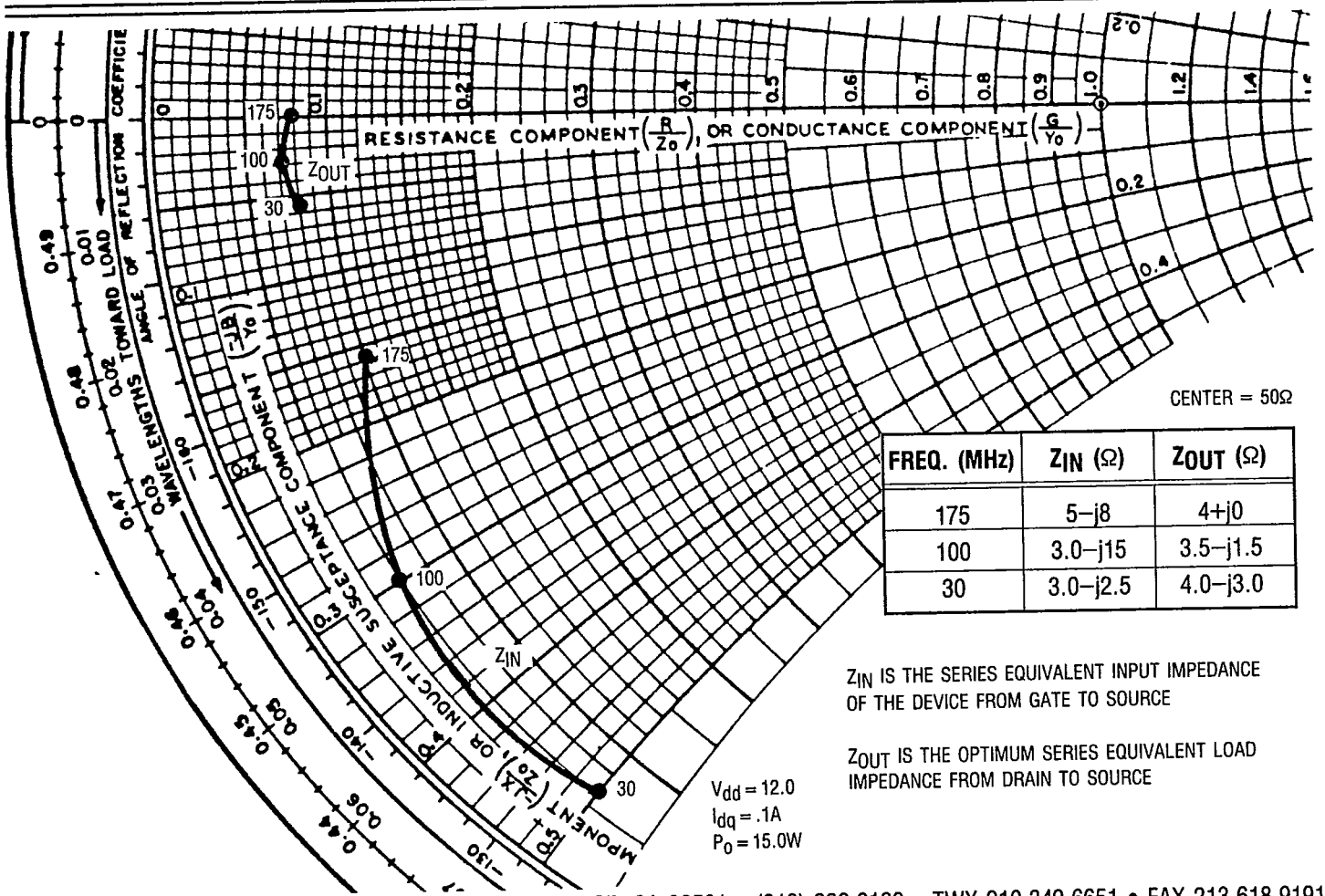


FIGURE 6. Package Outline Drawing



DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.720	0.730	18,30	18,50
B	0.113	0.130	2,87	3,30
C	0.790	0.810	20,07	20,57
D	0.390	0.410	9,91	10,41
E	0.215	0.235	5,46	5,97
F	0.245	0.255	6,22	6,48
G	40°	50°	— —	— —
H	0.299	0.281	5,82	7,14
J	0.004	0.006	0,10	0,15
K	0.360	0.400	9,14	10,16
L	0.085	0.105	2,16	2,67
M	0.150	0.190	3,81	4,83
N	0.970	0.980	24,60	24,90

FIGURE 7. Typical Device Impedances



FREQ. (MHz)	Z_{IN} (Ω)	Z_{OUT} (Ω)
175	5–j8	4+j0
100	3.0–j15	3.5–j1.5
30	3.0–j2.5	4.0–j3.0

Z_{IN} IS THE SERIES EQUIVALENT INPUT IMPEDANCE OF THE DEVICE FROM GATE TO SOURCE

Z_{OUT} IS THE OPTIMUM SERIES EQUIVALENT LOAD IMPEDANCE FROM DRAIN TO SOURCE