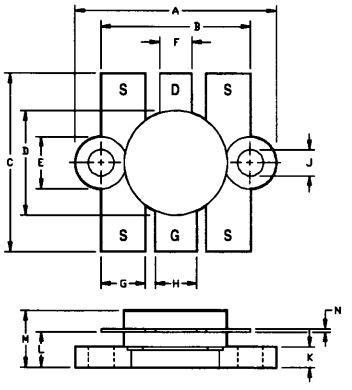
RF MOSFET Power Transistor, 120W, 28V
2 - 175 MHz

DU28120T

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- High Saturated Output Power
- Lower Noise Figure Than Bipolar Devices



LETTER DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.64	24.89	.970	.980
B	18.29	18.54	.720	.730
C	21.21	21.97	.835	.865
D	12.60	12.85	.496	.506
E	6.22	6.48	.245	.255
F	3.81	4.06	.150	.160
G	5.33	5.59	.210	.220
H	5.08	5.33	.200	.210
J	3.05	3.30	.120	.130
K	2.29	2.54	.090	.100
L	4.06	4.57	.160	.180
M	6.68	7.49	.263	.295
N	.10	.15	.004	.006

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	65	V
Gate-Source Voltage	V_{GS}	20	V
Drain-Source Current	I_{DS}	24	A
Power Dissipation	P_D	269	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	0.65	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	65	-	V	V_{GS}=0.0 V, I_{DS}=30.0 mA
Drain-Source Leakage Current	I_{DSS}	-	6.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V
Gate-Source Leakage Current	I_{GSS}	-	6.0	µA	V_{GS}=20.0 V, V_{DS}=0.0 V
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	6.0	V	V_{DS}=10.0 V, I_{DS}=600.0 mA
Forward Transconductance	G_M	3.0	-	S	V_{DS}=10.0 V, I_{DS}=6000.0 A, ΔV_{GS}=1.0 V, 80 µs Pulse
Input Capacitance	C_{ISS}	-	270	pF	V_{DS}=28.0 V, F=1.0 MHz
Output Capacitance	C_{OSS}	-	240	pF	V_{DS}=28.0 V, F=1.0 MHz
Reverse Capacitance	C_{RSS}	-	48	pF	V_{DS}=28.0 V, F=1.0 MHz
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Drain Efficiency	η_D	60	-	%	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	30:1	-	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz

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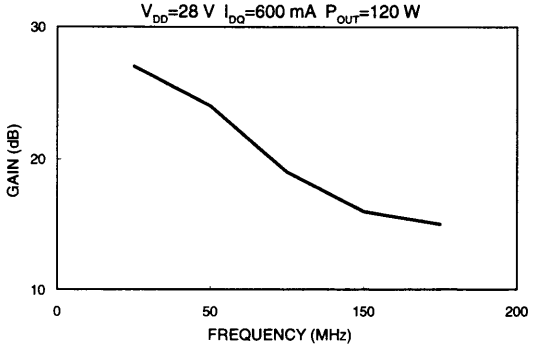
Typical Broadband Performance Curves

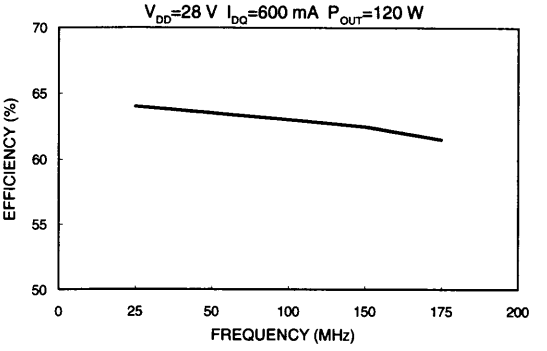
GAIN vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



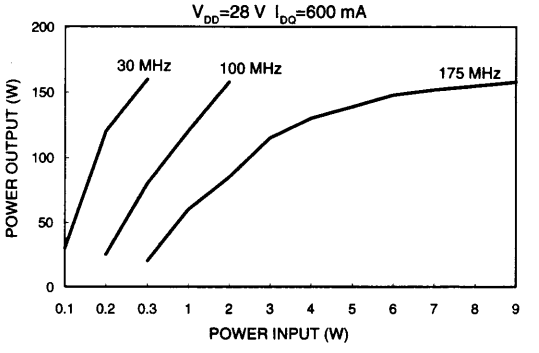
EFFICIENCY vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



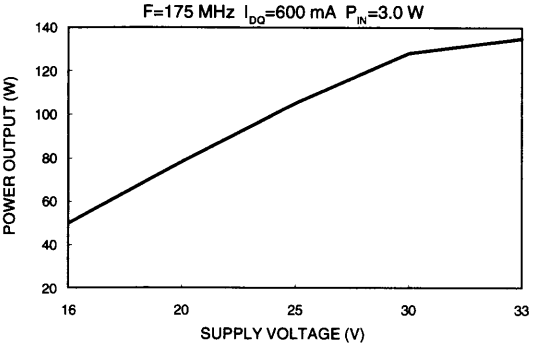
POWER OUTPUT vs POWER INPUT

V_{DD}=28 V I_{DQ}=600 mA



POWER OUTPUT vs SUPPLY VOLTAGE

F=175 MHz I_{DQ}=600 mA P_{IN}=3.0 W



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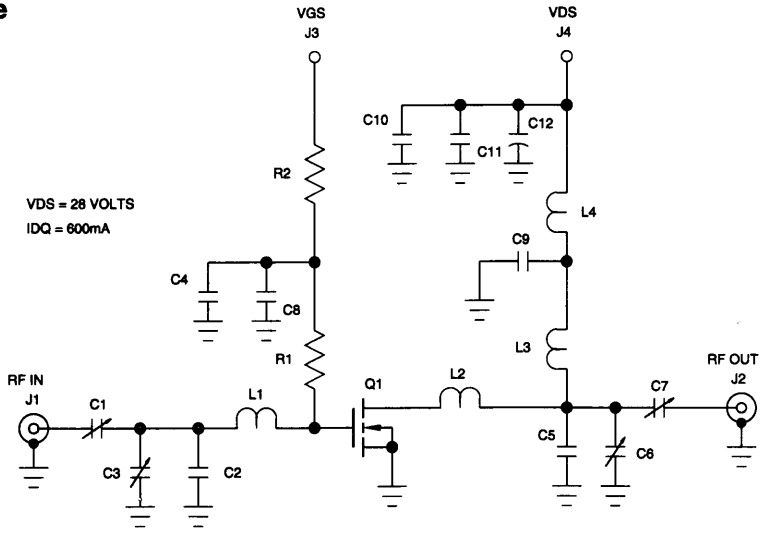
Typical Device Impedance

Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	4.0 - j 8.0	3.4 + j 2.4
100	1.0 - j 2.5	2.2 + j 1.3
175	1.0 - j 0.5	2.2 + j 0.0

V_{DD}=28 V, I_{DQ}=600 mA, P_{OUT}=120 Watts

Z_{IN} is the series equivalent input impedance of the device from gate to source.
Z_{LOAD} is the series equivalent load impedance as measured from drain to ground.

RF Test Fixture



PARTS LIST

C1,C6	TRIMMER CAPACITOR 5-80pF
C2,C5	CAPACITOR 50pF
C3	TRIMMER CAPACITOR 4-40pF
C4,C11	MONOLITHIC CIRCUIT CAPACITOR 0.01uF
C7	TRIMMER CAPACITOR 9-180pF
C8,C9	CAPACITOR 500pF
C10	CAPACITOR 1000pF
C12	ELECTROLYTIC CAPACITOR 50uF 50 VOLT
L1,L2	NO. 12 AWG COPPER WIRE X 0.87" (LOOP 0.4")
L3,L4	8 TURNS OF NO. 16 AWG ENAMEL WIRE ON '0.25", CLOSE WOUND
R1,R2	RESISTOR 2.7K OHMS 0.25 WATT
Q1	DU28120T
BOARD	FR4 0.062"

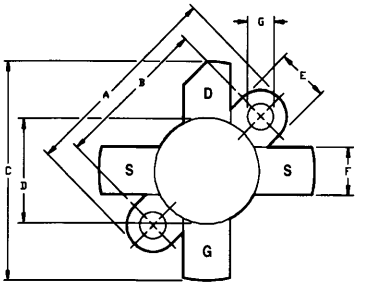
RF MOSFET Power Transistor, 120W, 28V
2 - 175 MHz

DU28120U

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- High Saturated Output Power
- Lower Noise Figure Than Competitive Devices



LETTER DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	24.64	24.89	.970	.980
B	18.29	18.54	.720	.730
C	25.91	26.42	1.020	1.040
D	12.60	12.85	.496	.506
E	6.22	6.48	.245	.255
F	5.59	5.84	.220	.230
G	3.05	3.30	.120	.130
H	2.21	2.59	.087	.102
J	3.91	4.42	.154	.174
K	6.53	7.34	.257	.289
L	.10	.15	.004	.006

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	65	V
Gate-Source Voltage	V_{GS}	20	V
Drain-Source Current	I_{DS}	24	A
Power Dissipation	P_D	269	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	0.65	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	65	-	V	V_{GS}=0.0 V, I_{DS}=30.0 mA
Drain-Source Leakage Current	I_{DSS}	-	6.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V
Gate-Source Leakage Current	I_{GSS}	-	6.0	µA	V_{GS}=20.0 V, V_{DS}=0.0 V
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	6.0	V	V_{DS}=10.0 V, I_{DS}=600.0 mA
Forward Transconductance	G_M	3.0	-	S	V_{DS}=10.0 V, I_{DS}=6.0 A, ΔV_{GS}=1.0 V, 80 µs Pulse
Input Capacitance	C_{ISS}	-	270	pF	V_{DS}=28.0 V, F=1.0 MHz
Output Capacitance	C_{OSS}	-	240	pF	V_{DS}=28.0 V, F=1.0 MHz
Reverse Capacitance	C_{RSS}	-	48	pF	V_{DS}=28.0 V, F=1.0 MHz
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Drain Efficiency	η_D	60	-	%	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	30:1	-	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz

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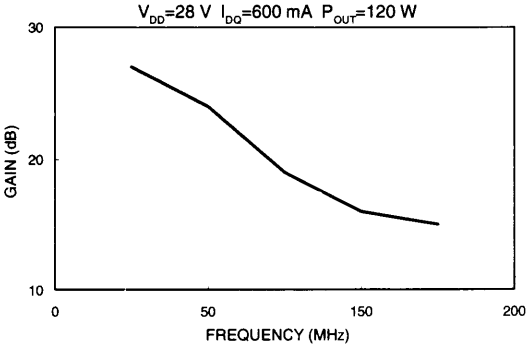
Typical Broadband Performance Curves

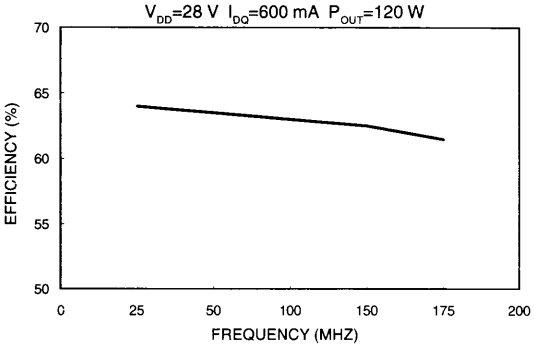
GAIN vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



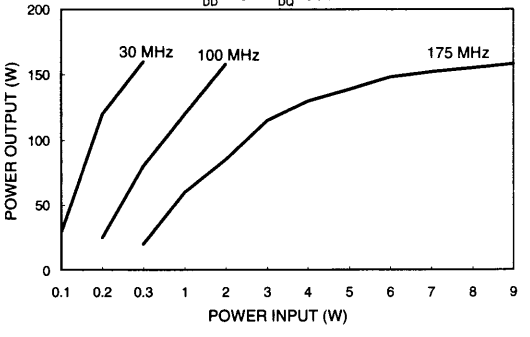
EFFICIENCY vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



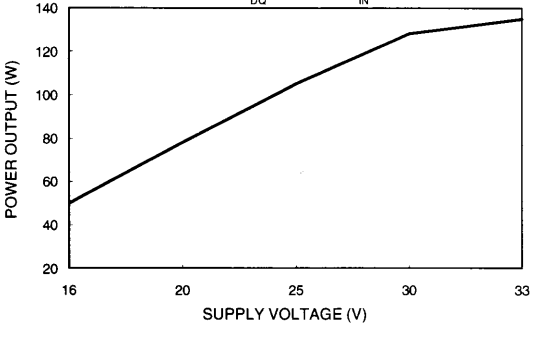
POWER OUTPUT vs POWER INPUT

V_{DD}=28 V I_{DQ}=600 mA



POWER OUTPUT vs SUPPLY VOLTAGE

F=175 MHz I_{DQ}=600 mA P_{IN}=3.0 W



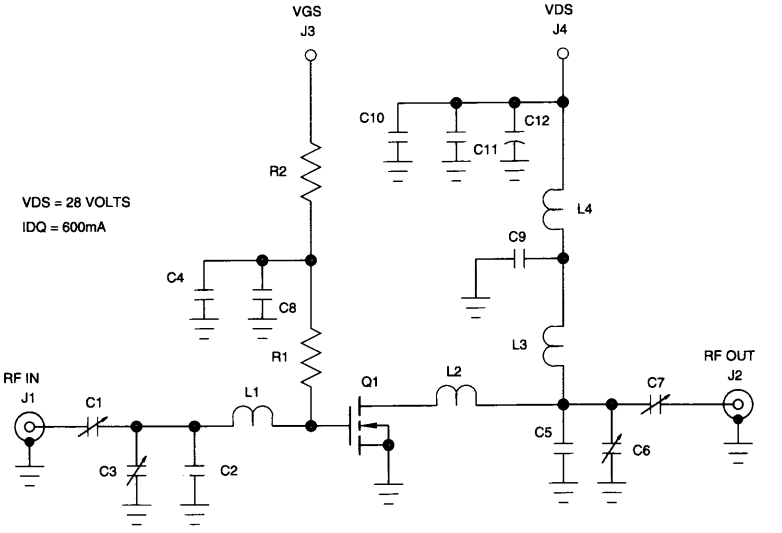
Typical Device Impedance

Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	4.0 - j 8.0	3.4 + j 2.4
100	1.0 - j 2.5	2.2 + j 1.3
175	1.0 - j 0.5	2.2 + j 0.0

V_{DD}=28 V, I_{DQ}=600 mA, P_{OUT}=120 Watts

Z_{IN} is the series equivalent input impedance of the device from gate to source.
Z_{LOAD} is the series equivalent load impedance as measured from drain to ground.

RF Test Fixture



PARTS LIST

C1,C6	TRIMMER CAPACITOR 5-80pF
C2,C5	CAPACITOR 50pF
C3	TRIMMER CAPACITOR 4-40pF
C4,C11	MONOLITHIC CIRCUIT CAPACITOR 0.01uF
C7	TRIMMER CAPACITOR 9-180pF
C8,C9	CAPACITOR 500pF
C10	CAPACITOR 1000pF
C12	ELECTROLYTIC CAPACITOR 50uF 50 VOLT
L1,L2	NO. 12 AWG COPPER WIRE X 0.87" (LOOP 0.4")
L3,L4	8 TURNS OF NO. 16 AWG ENAMEL WIRE ON '0.25", CLOSE WOUND
R1,R2	RESISTOR 2.7K OHMS 0.25 WATT
Q1	DU28120U
BOARD	FR4 0.062"

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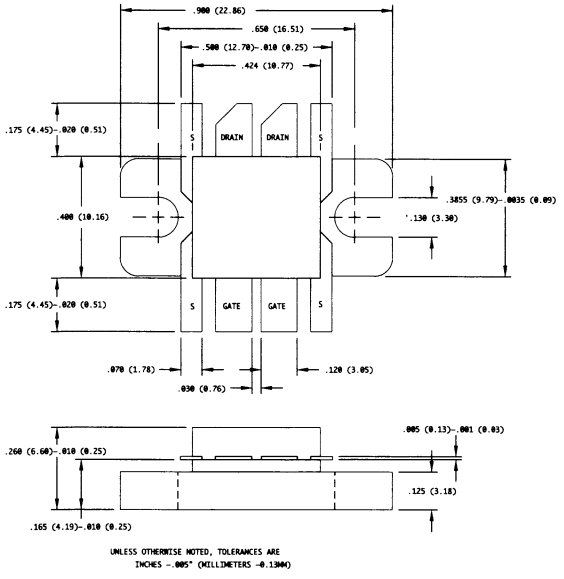
RF MOSFET Power Transistor, 120W, 28V
2 - 175 MHz

DU28120V

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- High Saturated Output Power
- Lower Noise Figure Than Competitive Devices



Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	65	V
Gate-Source Voltage	V_{GS}	20	V
Drain-Source Current	I_{DS}	12*	A
Power Dissipation	P_D	250	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STJ}	-55 to +150	°C
Thermal Resistance	θ_{JC}	0.7	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	65	-	V	V_{GS}=0.0 V, I_{DS}=30.0 mA*
Drain-Source Leakage Current	I_{DSS}	-	6.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V*
Gate-Source Leakage Current	I_{GSS}	-	6.0	µA	V_{GS}=20.0 V, V_{DS}=0.0 V*
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	6.0	V	V_{DS}=10.0 V, I_{DS}=600.0 mA*
Forward Transconductance	G_M	3.0	-	S	V_{DS}=10.0 V, I_{DS}=6000.0 A, ΔV_{GS}=1.0 V, 80 µs Pulse*
Input Capacitance	C_{ISS}	-	270	pF	V_{DS}=28.0 V, F=1.0 MHz*
Output Capacitance	C_{OSS}	-	240	pF	V_{DS}=28.0 V, F=1.0 MHz*
Reverse Capacitance	C_{RSS}	-	48	pF	V_{DS}=28.0 V, F=1.0 MHz*
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Drain Efficiency	η_D	60	-	%	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Return Loss	R_L	10	-	%	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	30:1	-	V_{DD}=28.0 V, I_{DQ}=600 mA, P_{OUT}=120.0 W, F=175 MHz

* Per side

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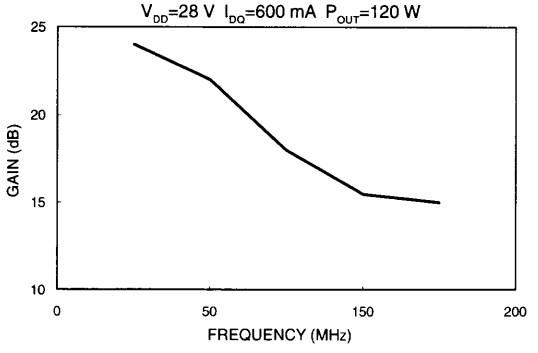
Typical Broadband Performance Curves

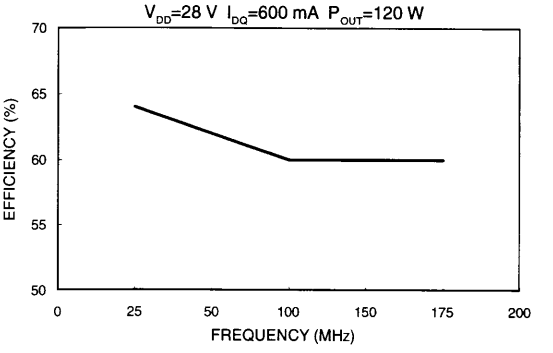
GAIN vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



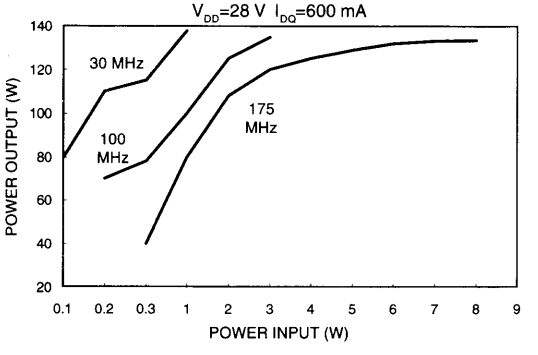
EFFICIENCY vs FREQUENCY

V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



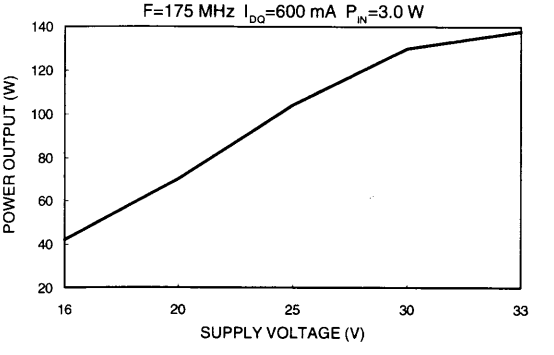
POWER OUTPUT vs POWER INPUT

V_{DD}=28 V I_{DQ}=600 mA



POWER OUTPUT vs SUPPLY VOLTAGE

F=175 MHz I_{DQ}=600 mA P_{IN}=3.0 W



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Typical Device Impedance

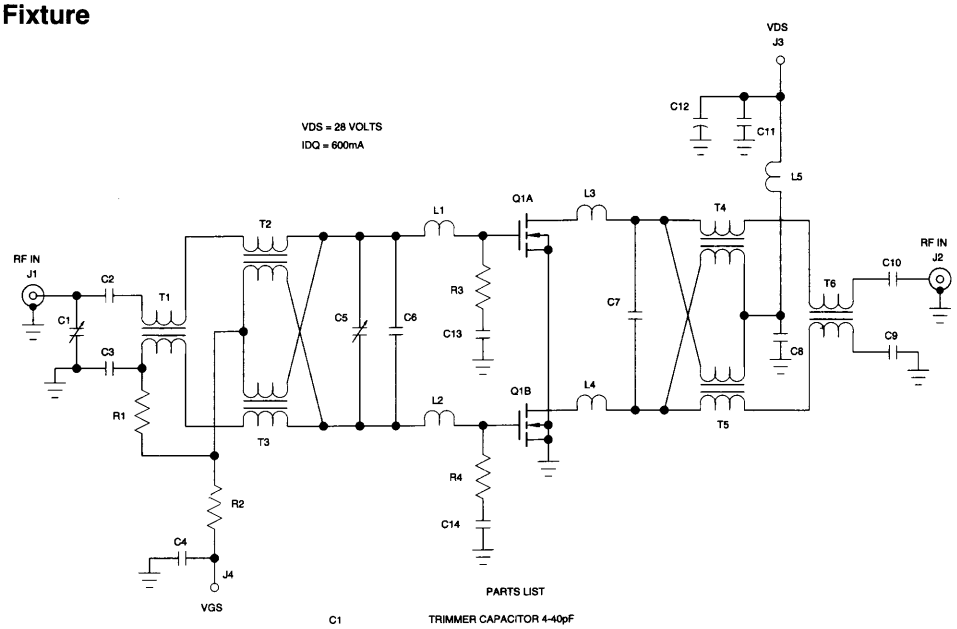
Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	3.0 - j 12.5	8.0 + j 6.0
100	1.5 - j 8.5	7.0 + j 6.5
175	1.0 - j 6.0	6.5 + j 5.0

V_{DD}=28 V, I_{DQ}=600 mA, P_{OUT}=120 Watts

Z_{IN} is the series equivalent input impedance of the device from gate to gate.

Z_{LOAD} is the optimum series equivalent load impedance as measured from drain to drain.

RF Test Fixture



PARTS LIST

C1	TRIMMER CAPACITOR 4-40pF
C2,C3,C4, C8,C9,C10 C11,C13,C14	CAPACITOR 0.001pF
C5	TRIMMER CAPACITOR 5-80pF
C6	CAPACITOR 68pF
C7	CAPACITOR 50pF
C12	ELECTROLYTYIC CAPACITOR 100uF 50 VOLTS
L1,L2	0.50" X 0.10" TRACE ON BOARD + '0.125" X '0.25" LOOP
L3,L4	0.87" X 0.10" TRACE ON BOARD
L5	7.5 TURNS OF NO. 20 AWG COPPER WIRE X '0.31"
R1,R3,R4	RESISTOR 18 OHMS 2 WATTS
R2	RESISTOR 10K OHMS
T1,T6	50 OHM BALUN CORES, 2 TURNS OF 50 OHM COAX THRU 2 STACKPOLE 57-1522
T2,T3,T4,	4:1 TRANSFORMER 2 TURNS OF 2 50 OHM COAX THRU
T5	2 STACKPOLE 57-1522 BALUN CORES
Q1	DU28120V
BOARD	FR4 0.062"

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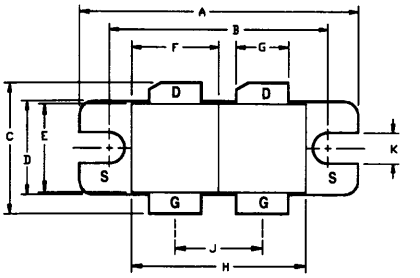
RF MOSFET Power Transistor, 200W, 28V
2 - 175 MHz

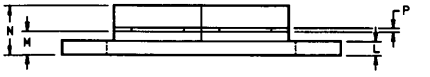
DU28200M

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- High Saturated Output Power
- Lower Noise Figure Than Competitive Devices





LETTER DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	30.35	30.61	1.195	1.205
B	23.65	23.90	.931	.941
C	13.72	14.22	.540	.560
D	9.63	9.88	.379	.389
E	9.40	9.65	.370	.380
F	9.40	9.65	.370	.380
G	5.59	5.84	.220	.230
H	18.80	19.30	.740	.760
J	9.40	9.65	.370	.380
K	3.12	3.38	.123	.133
L	1.47	1.57	.058	.062
M	2.39	2.74	.094	.108
N	5.03	5.69	.198	.224
P	.05	.13	.002	.005

Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	65	V
Gate-Source Voltage	V_{GS}	20	V
Drain-Source Current	I_{DS}	20	A
Power Dissipation	P_D	389	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-65 to +150	°C
Thermal Resistance	θ_{JC}	0.45	°C/W

Electrical Characteristics at 25°C

Parameter	Symbol	Min	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	65	-	V	V_{GS}=0.0 V, I_{DS}=25.0 mA*
Drain-Source Leakage Current	I_{DSS}	-	5.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V*
Gate-Source Leakage Current	I_{GSS}	-	5.0	μA	V_{GS}=20.0 V, V_{DS}=0.0 V*
Gate Threshold Voltage	$V_{GS(TH)}$	2.0	6.0	V	V_{DS}=10.0 V, I_{DS}=500.0 mA*
Forward Transconductance	G_M	2.5	-	S	V_{DS}=10.0 V, I_{DS}=5.0 A, ΔV_{GS}=1.0 V, 80 μs Pulse*
Input Capacitance	C_{ISS}	-	225	pF	V_{DS}=28.0 V, F=1.0 MHz*
Output Capacitance	C_{OSS}	-	200	pF	V_{DS}=28.0 V, F=1.0 MHz*
Reverse Capacitance	C_{RSS}	-	40	pF	V_{DS}=28.0 V, F=1.0 MHz*
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=1000 mA, P_{OUT}=200.0 W, F=175 MHz
Drain Efficiency	η_D	55	-	%	V_{DD}=28.0 V, I_{DQ}=1000 mA, P_{OUT}=200.0 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	10:1	-	V_{DD}=28.0 V, I_{DQ}=1000 mA, P_{OUT}=200.0 W, F=175 MHz

* Per Side

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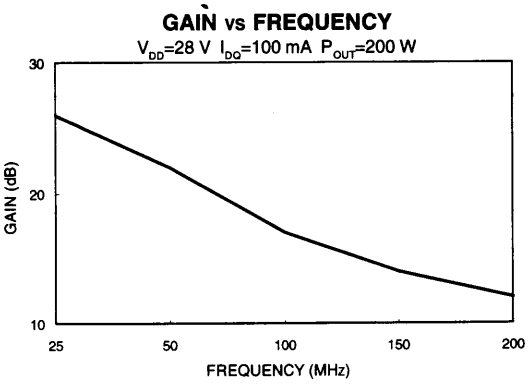
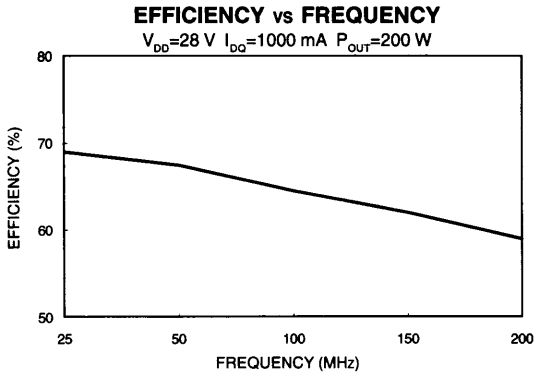
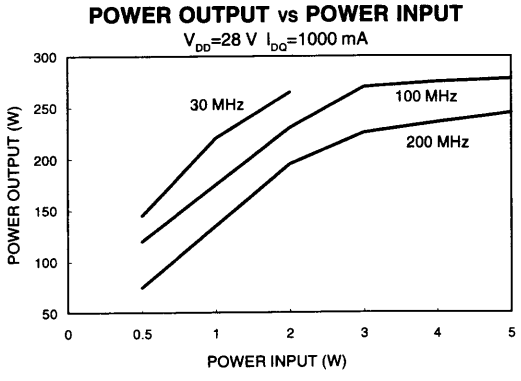
Typical Broadband Performance Curves







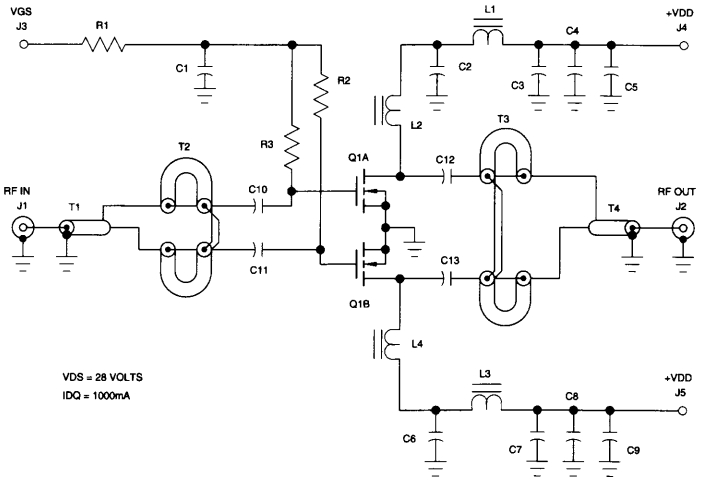
Typical Device Impedance

Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	2.7 - j 4.8	7.2 - j 1.9
100	1.6 - j 3.0	5.25 - j 1.4
150	1.5 - j 2.0	5.0 - j 0.7
175	1.6 - j 1.0	5.2 - j 0.6
200	1.8 - j 0.5	5.5 - j 0.5

V_{DD}=28 V, I_{DQ}=1000 mA, P_{OUT}=200 Watts

Z_{IN} is the series equivalent input impedance of the device from gate to source.
Z_{LOAD} is the series optimum equivalent load impedance as measured from drain to drain.

RF Test Fixture



PARTS LIST

C1,C2,C5, C6,C9	UNELCO CAPACITOR 1000pF
C3	CAPACITOR 50uF
C4,C8	CAPACITOR 0.1uF
C7	ELECTROLYTIC CAPACITOR 50uF 50 V.
C10,C11	CAPACITOR ATC 500pF
C12,C13	CAPACITOR 2X ATC 500pF
L1,L3	1 TURN OF NO. 14 AWG THROUGH BINOCULAR CORE
L2,L4	4 TURNS OF NO. 14 AWG THROUGH BINOCULAR CORE
R1	RESISTOR 6800 OHM 0.5 WATT
R2,R3	RESISTOR 2700 OHM 0.5 WATT
T1,T4	1:1 BALUN 50 OHM COAX X 4"
T2,T3	TWO SECTIONS, 4" EACH OF 25 OHM COAX, CONNECTED IN A 9:1 CONFIGURATION
Q1	DU28200M
BOARD	FR4 0.062"

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