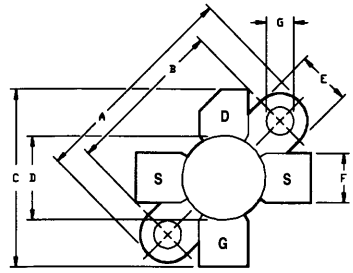
RF MOSFET Power Transistor, 5W, 28V
2 - 175 MHz

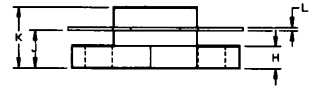
DU2805S

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	20.07	20.83	.790	.820
D	9.47	9.73	.373	.383
E	6.22	6.48	.245	.255
F	5.64	5.79	.222	.228
G	2.92	3.30	.115	.130
H	2.29	2.67	.090	.105
J	4.04	4.55	.159	.179
K	6.58	7.39	.259	.291
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}	1.4	A
Power Dissipation	P_D	15.8	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	11.1	°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}=2.0 mA
Drain-Source Leakage Current	I_{DSS}	-	1.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V
Gate-Source Leakage Current	I_{GSS}	-	1.0	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}=10 mA
Forward Transconductance	G_M	80	-	mS	V_{DS}=10.0 V, I_{DS}=10 mA, ΔV_{GS}=1.0 V, 80 µs Pulse
Input Capacitance	C_{ISS}	-	7	pF	V_{DS}=28.0 V, F=1.0 MHz
Output Capacitance	C_{OSS}	-	5	pF	V_{DS}=28.0 V, F=1.0 MHz
Reverse Capacitance	C_{RSS}	-	2.4	pF	V_{DS}=28.0 V, F=1.0 MHz
Power Gain	G_P	11	-	dB	V_{DD}=28.0 V, I_{DQ}=50 mA, P_{OUT}=5.0 W, F=175 MHz
Drain Efficiency	η_D	55	-	%	V_{DD}=28.0 V, I_{DQ}=50 mA, P_{OUT}=5.0 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	20:1	-	V_{DD}=28.0 V, I_{DQ}=50 mA, P_{OUT}=5.0 W, F=175 MHz

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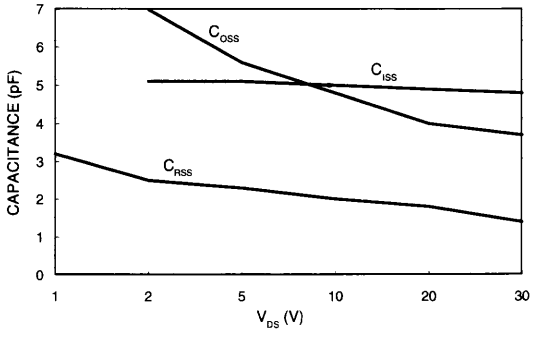
Typical Broadband Performance Curves

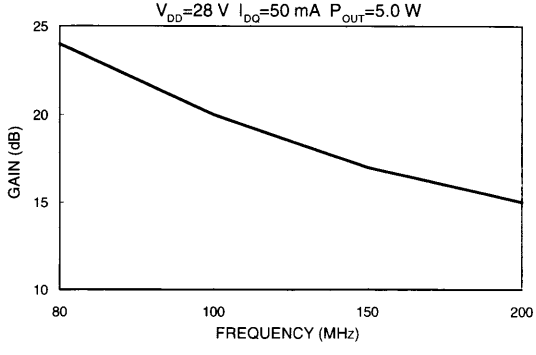
CAPACITANCES vs VOLTAGE

F=1.0 MHz



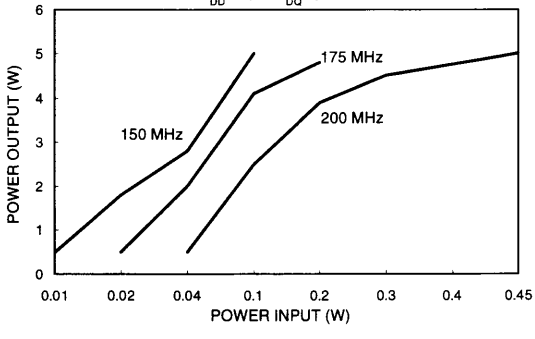
GAIN vs FREQUENCY

V_{DD}=28 V I_{DQ}=50 mA P_{OUT}=5.0 W



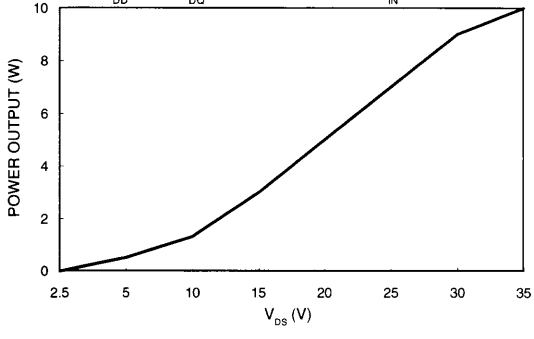
POWER OUTPUT vs POWER INPUT

V_{DD}=28 V I_{DQ}=50 mA



POWER OUTPUT vs VOLTAGE

V_{DD}=28 V I_{DQ}=50 mA F=175 MHz P_{IN}=315 mW



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Typical Device Impedance

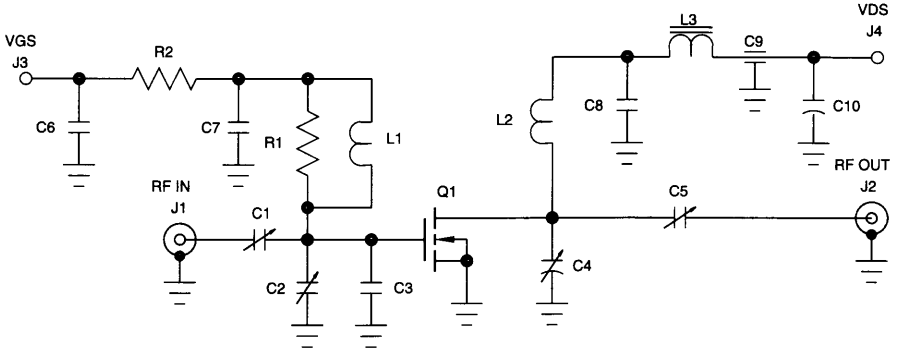
Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
100	15.0 - j 121.0	57.0 + j 23.0
150	39.0 - j 77.0	55.0 + j 23.0
175	41.0 - j 38.0	56.0 + j 19.0
200	34.0 - j 14.0	56.0 + j 20.0

V_{DD}=28 V, I_{DQ}=50 mA, P_{OUT}=5 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 ground.

RF Test Fixture



PARTS LIST

C1	TRIMMER CAPACITOR 5-80pF
C2	TRIMMER CAPACITOR 7-100pF
C3	CAPACITOR 15pF
C4,C5	TRIMMER CAPACITOR 9-180pF
C6,C8	CAPACITOR 1000pF
C7	CAPACITOR 500pF
C9	FEEDTHROUGH CAPACITOR 1000pF
C10	ELECTROLYTIC CAPACITOR 25uF 50 VOLTS
L1	2 TURNS OF NO. 12 AWG ON '0.25"
L2	8 TURNS OF NO. 12 AWG ON '0.25"
L3	1 TURN OF NO. 12 AWG W/ SIEMENS DOUBLE APERTURE CORE B62152-A0001-X001
Q1	DU2805S
BOARD	FR4 0.062"

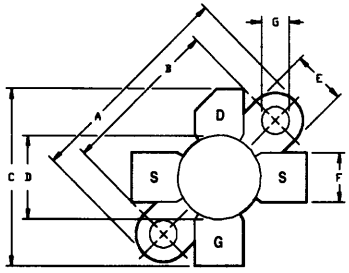
RF MOSFET Power Transistor, 10W, 28V
2 - 175 MHz

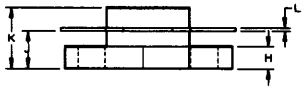
DU2810S

V2.00

Features

- N-Channel Enhancement Mode Device
- DMOS Structure
- Lower Capacitances for Broadband Operation
- Common Source Configuration
- Low Noise Floor





LETTER DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	24.64	24.89	.970	.980
B	18.29	18.54	.720	.730
C	20.07	20.83	.790	.820
D	9.47	9.73	.373	.383
E	6.22	6.48	.245	.255
F	5.64	5.79	.222	.228
G	2.92	3.30	.115	.130
H	2.29	2.67	.090	.105
J	4.04	4.55	.159	.179
K	6.58	7.39	.259	.291
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}	2.8	A
Power Dissipation	P_D	35	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-65 to +150	°C
Thermal Resistance	θ_{JC}	2	°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}=4.0 mA
Drain-Source Leakage Current	I_{DSS}	-	2.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V
Gate-Source Leakage Current	I_{GSS}	-	2.0	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}=20 mA
Forward Transconductance	G_M	160	-	mS	V_{DS}=10.0 V, I_{DS}=200 mA, Pulsed 80-300 µs
Input Capacitance	C_{ISS}	-	14	pF	V_{DS}=28.0 V, F=1.0 MHz
Output Capacitance	C_{OSS}	-	10	pF	V_{DS}=28.0 V, F=1.0 MHz
Reverse Capacitance	C_{RSS}	-	4.6	pF	V_{DS}=28.0 V, F=1.0 MHz
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=10 W, F=175 MHz
Drain Efficiency	η_D	55	-	%	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=10 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	20:1	-	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=10 W, F=175 MHz

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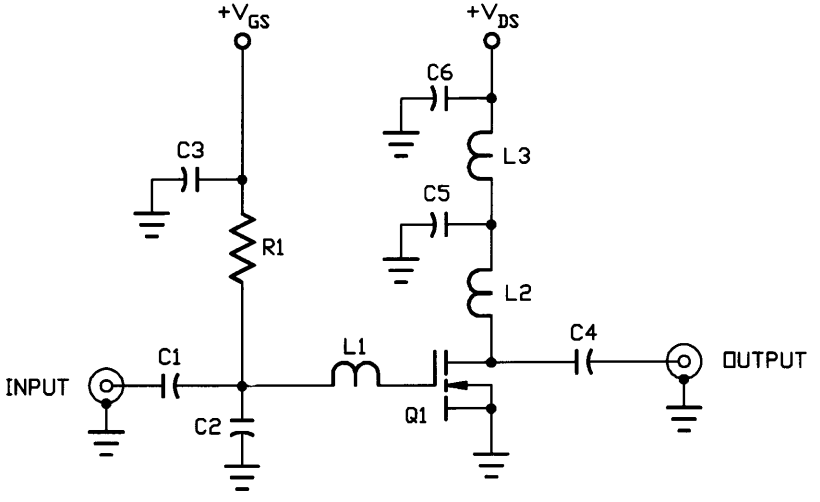
Typical Device Impedance

Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	27.0 - j 11.0	23.0 - j 3.0
50	24.0 - j 15.0	19.0 - j 5.0
100	18.0 - j 18.0	14.0 - j 6.0
200	12.0 - j 19.0	9.0 - j 5.0

V_{DD}=28 V, I_{DQ}=100 mA, P_{OUT}=10.0 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



C2	20 pF, UNELCO
C1 C3	500 pF, UNELCO
C4 C5	1000 pF, UNELCO
C6	5 uF ELECTROLYTIC
R1	12K OHM
L2	4 TURNS OF NO. 16 AWG ON .10" ID
L1	2 TURNS OF NO. 16 AWG ON .35" ID
L3	5 TURNS OF NO. 16 AWG ON .35" ID
Q1	DU2810S

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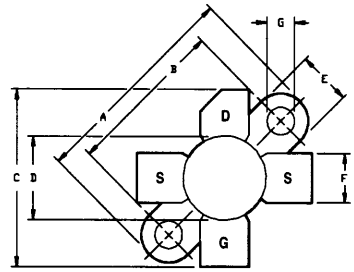
RF MOSFET Power Transistor, 20W, 28V
2 - 175 MHz

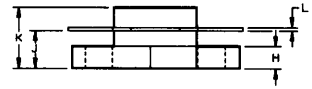
DU2820S

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		INCHES	
	MIN	MAX	MIN	MAX
A	24.64	24.89	.970	.980
B	18.29	18.54	.720	.730
C	20.07	20.83	.790	.820
D	9.47	9.73	.373	.383
E	6.22	6.48	.245	.255
F	5.64	5.79	.222	.228
G	2.92	3.30	.115	.130
H	2.29	2.67	.090	.105
J	4.04	4.55	.159	.179
K	6.58	7.39	.259	.291
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	62.5	W
Junction Temperature	T_J	200	°C
Storage Temperature	T_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	2.8	°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}=5.0 mA
Drain-Source Leakage Current	I_{DSS}	-	1.0	mA	V_{DS}=28.0 V, V_{GS}=0.0 V
Gate-Source Leakage Current	I_{GSS}	-	1.0	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}=100.0 mA
Forward Transconductance	G_M	500	-	mS	V_{DS}=10.0 V, I_{DS}=100.0 mA, ΔV_{GS}=1.0 V, 80 µs Pulse
Input Capacitance	C_{ISS}	-	45	pF	V_{DS}=28.0 V, F=1.0 MHz
Output Capacitance	C_{OSS}	-	40	pF	V_{DS}=28.0 V, F=1.0 MHz
Reverse Capacitance	C_{RSS}	-	8	pF	V_{DS}=28.0 V, F=1.0 MHz
Power Gain	G_P	13	-	dB	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=20 W, F=175 MHz
Drain Efficiency	η_D	60	-	%	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=20 W, F=175 MHz
Load Mismatch Tolerance	VSWR-T	-	30:1	-	V_{DD}=28.0 V, I_{DQ}=100 mA, P_{OUT}=20 W, F=175 MHz

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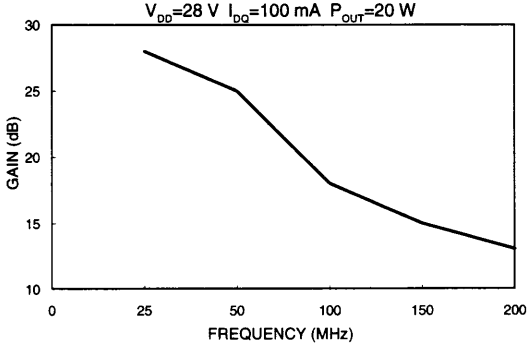
Typical Broadband Performance Curves

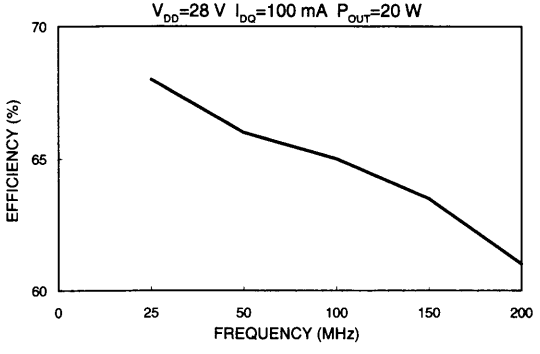
GAIN vs FREQUENCY

V_{DD}=28 V I_{DQ}=100 mA P_{OUT}=20 W



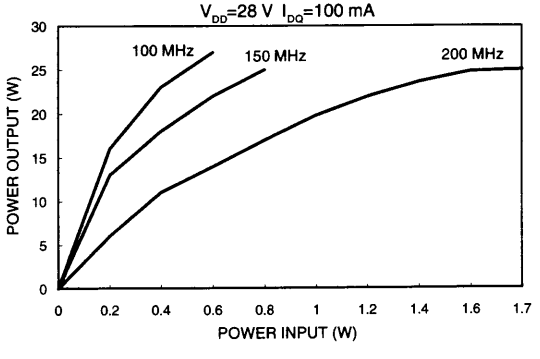
EFFICIENCY vs FREQUENCY

V_{DD}=28 V I_{DQ}=100 mA P_{OUT}=20 W



POWER OUTPUT vs POWER INPUT

V_{DD}=28 V I_{DQ}=100 mA



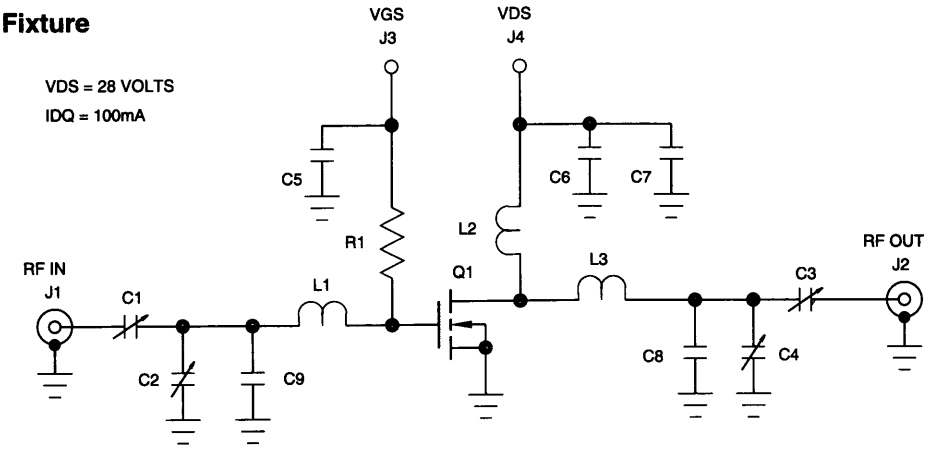
Typical Device Impedance

Frequency (MHz)	Z_{IN} (OHMS)	Z_{LOAD} (OHMS)
30	17.5 - j 13.0	16.0 + j 2.5
50	15.0 - j 15.5	15.0 + j 4.0
100	8.0 - j 14.0	12.0 + j 6.0
200	5.5 - j 8.0	9.25 + j 6.0

V_{DD}=28 V, I_{DQ}=100 mA, P_{OUT}=20 Watts

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

RF Test Fixture



PARTS LIST

C1,C3	TRIMMER CAPACITOR 5-80pF
C2,C4	TRIMMER CAPACITOR 3-30pF
C5,C6	CAPACITOR 0.01uF
C7	CAPACITOR 0.001uF
C8	CAPACITOR 5.6pF
C9	CAPACITOR 10pF
L1,L3	2 TURNS OF NO. 20 ENAMEL WIRE ON '0.25" CLOSE WOUND
L2	7 TURNS OF NO. 20 ENAMEL WIRE ON '0.25" CLOSE WOUND
R1	RESISTOR 100K OHMS
Q1	DU2820S
BOARD	FR4 0.062"