DU28120V

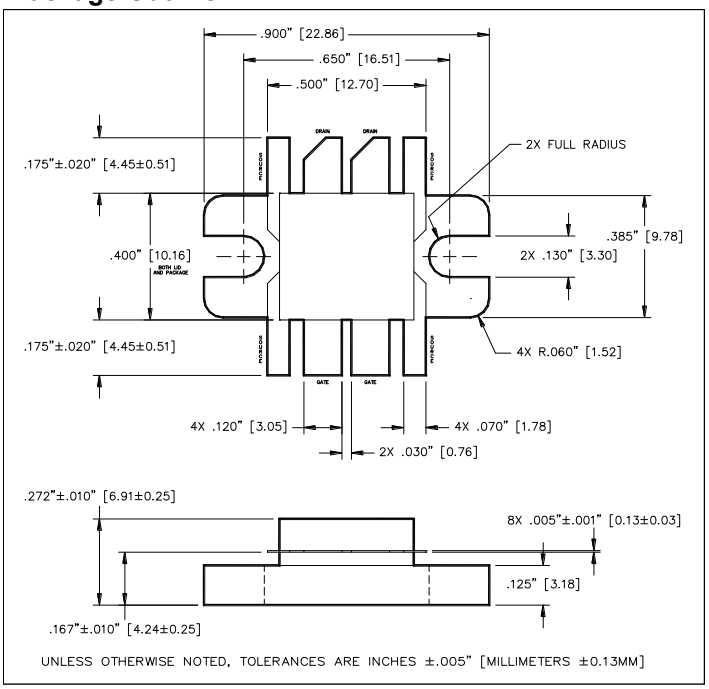
RF Power MOSFET Transistor
120 W, 2 - 175 MHz, 28 V

Rev. V1

Features

- N-Channel enhancement mode device
- DMOS structure
- Lower capacitances for broadband operation
- High saturated output power
- Lower noise figure than bipolar devices
- RoHS Compliant

Package Outline



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_{STG}	-55 to +150	°C
Thermal Resistance	θ_{JC}	0.7	°C/W

TYPICAL DEVICE IMPEDANCE

F (MHz)	Z_{IN} (Ω)	Z_{LOAD} (Ω)
30	3.0 - j12.5	8.0 + j6.0
50	1.5 - j8.5	7.0 +j6.5
100	1.0 - j6.0	6.5 + j5.0
V_{DD} = 28V, I_{DQ} = 600mA, P_{OUT} = 120 W		

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

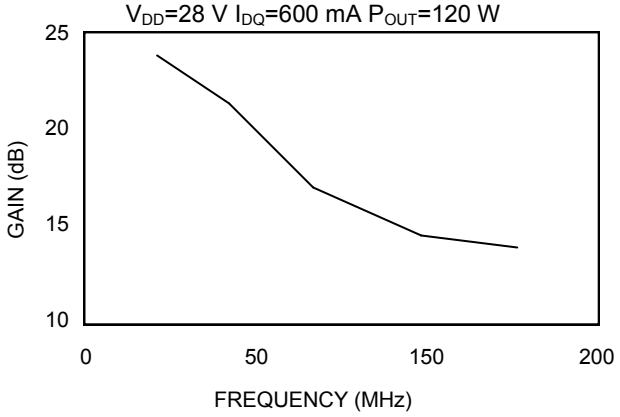
Z_{LOAD} is the optimum series equivalent load impedance as measured from drain to ground.

ELECTRICAL CHARACTERISTICS AT 25°C

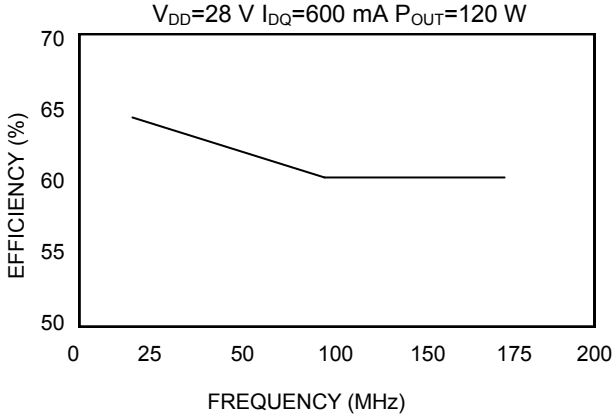
Parameter	Symbol	Min	Max	Units	Test Conditions
Drain-Source Breakdown Voltage	BV_{DSS}	65	-	V	V_{GS} = 0.0 V , I_{DS} = 3.0 mA
Drain-Source Leakage Current	I_{DSS}	-	6.0	mA	V_{GS} = 28.0 V , V_{GS} = 0.0 V
Gate-Source Leakage Current	I_{GSS}	-	6.0	µA	V_{GS} = 20.0 V , V_{DS} = 0.0 V
Gate Threshold Voltage	$V_{GS(TH)}$	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 mA , Δ V_{GS} = 1.0V, 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

Typical Broadband Performance Curves

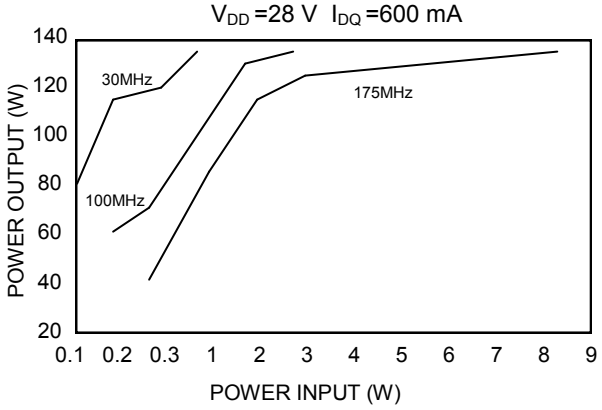
GAIN vs FREQUENCY
V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



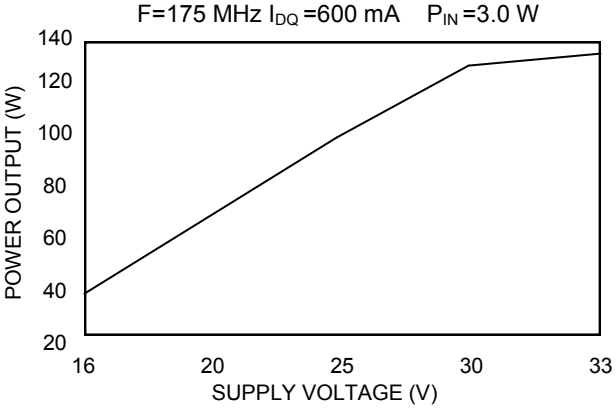
EFFICIENCY vs FREQUENCY
V_{DD}=28 V I_{DQ}=600 mA P_{OUT}=120 W



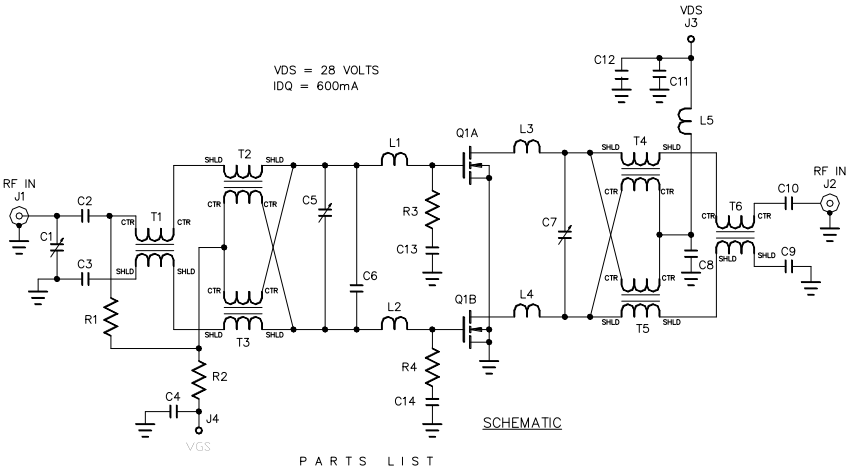
POWER OUTPUT vs POWER INPUT
V_{DD} =28 V I_{DQ} =600 mA



POWER OUTPUT vs SUPPLY VOLTAGE
F=175 MHz I_{DQ} =600 mA P_{IN} =3.0 W



TEST FIXTURE SCHEMATIC



PARTS LIST

C1	TRIMMER CAPACITOR 4–40pF	R1,R3,R4	RESISTOR 18 OHMS 2 WATTS
C2,C3,C4, C8,C9,C10 C11,C13,C14	CAPACITOR 0.001uF	R2	RESISTOR 10K OHMS
		T1,T6	50 OHM BALUN CORES, 2 TURNS OF 50 OHM COAX THRU 2 STACKPOLE 57–1522
C5	TRIMMER CAPACITOR 5–80pF	T2,T3,T4,	4:1 TRANSFORMER 2 TURNS OF 2 50 OHM COAX THRU
C6	CAPACITOR 68pF		
C7	CAPACITOR 50pF	T5	2 STACKPOLE 57–1522 BALUN CORES
C12	ELECTROLYTYIC CAPACITOR 100uF 50 VOLTS	Q1	DU28120V
L1,L2	0.50" X 0.10" TRACE ON BOARD + ø0.125" X ø0.25" LOOP	BOARD	FR4 0.062"
L3,L4	0.87" X 0.10" TRACE ON BOARD		
L5	7.5 TURNS OF NO. 20 AWG COPPER WIRE X ø0.31"		

TEST FIXTURE ASSEMBLY