DVD150T

Siliconix

100V RF Power FET

175 MHz 120 W
80-120 V 10 dB

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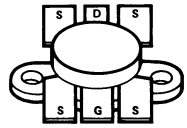
100 MHz 150 W
80-120 V 17 dB

Other Devices in Series:
DVD030S

FEATURES

- Infinite VSWR
- No Thermal Runaway
- Broadband Capability
- Class A, B, C, D, E
- Low Noise Figure
- High Dynamic Range
- Simple Bias Circuitry
- Lower I^2R Losses

Package Type T



.500 JO Flange

See page 5-62 for Package Dimensions

ABSOLUTE MAXIMUM RATINGS (T_C=25°C unless otherwise noted)

Gate-Source Voltage 40V
Drain-Source Voltage 220V
Drain-Gate Voltage 220V
Drain Current (DC) 4.8A
Total Device Dissipation 240W
Thermal Resistance, Junction to Case .. 0.73°C/W
Junction Temperature ..... 200°C
Storage Temperature ..... −65°C to +150°C

ELECTRICAL CHARACTERISTICS (T_C=25°C unless other noted)

Symbol	Characteristics	Min	Typ	Max	Unit	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	220			V	V_{GS} = 0V, I_D = 30 mA
I_{DSS}	Drain-Source Leakage Current			6.0	mA	V_{GS} = 0V, V_{DS} = 100V
I_{GSS}	Gate-Source Leakage Current			100	nA	V_{GS} = 40V, V_{DS} = 0V
g_m[1]	D.C. Forward Transconductance	1.0			Mho	V_{DS} = 50V, I_D = 5A, ΔV_{GS} = 1.0V
$I_{D(on)}$[1]	On-State Drain Current	1.5			A	V_{DS} = 50V, V_{GS} = 5V
$V_{GS(th)}$	Gate Threshold Voltage	2.0		6.0	V	V_{GS} = V_{DS}, I_D = 1.0 Amp
C_{iss}	Common-Source Input Capacitance			400	pF	V_{GS} = 0V, V_{DS} = 30V, f = 1.0 MHz
C_{oss}	Common-Source Output Capacitance			100	pF	V_{GS} = 0V, V_{DS} = 30V, f = 1.0 MHz
C_{rss}	Reverse Transfer Capacitance			15	pF	V_{GS} = 0V, V_{DS} = 30V, f = 1.0 MHz
G_{ps}	Common-Source Power Gain	10 17			dB	V_{DD} = 100V, V_{GS} = 0V, P_o = 120W, f = 175 MHz V_{DD} = 100V, V_{GS} = 0V, P_o = 150W, f = 100 MHz
η	Drain Efficiency		65		%	V_{DD} = 100V, P_o = 120W f = 175 MHz, V_{GS} = 0V
V_{SWR}	Load Mismatch Tolerance	30:1				V_{DD} = 100V, P_o = 120W f = 175 MHz, $I_{D(max)}$ = 2.4A

Note 1: Pulse Test—80μs to 300μs, 1% duty cycle

TYPICAL PERFORMANCE CURVES

FIGURE 1 Transfer Characteristics

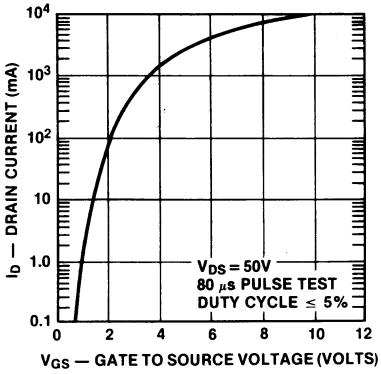


FIGURE 2 Output Characteristics

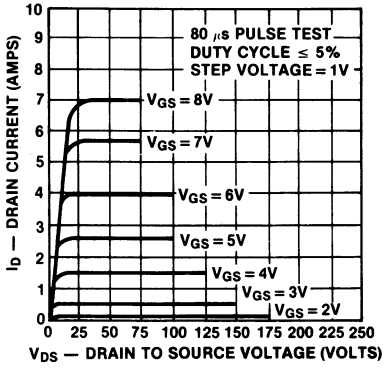


FIGURE 3 Transconductance vs. Drain Current

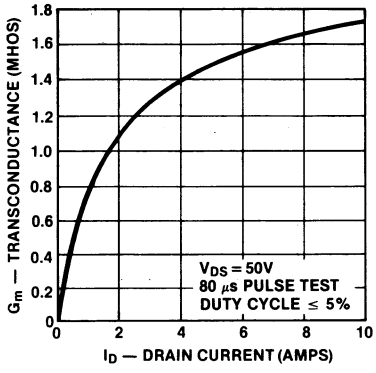


FIGURE 4 MTTF vs. Chip Temperature

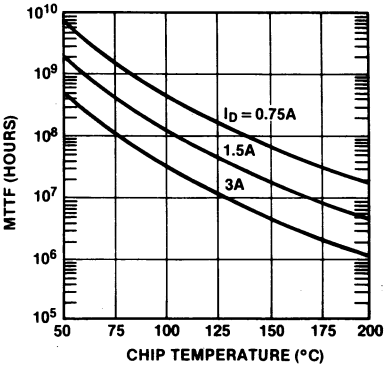


FIGURE 5 DC Safe Operating Region

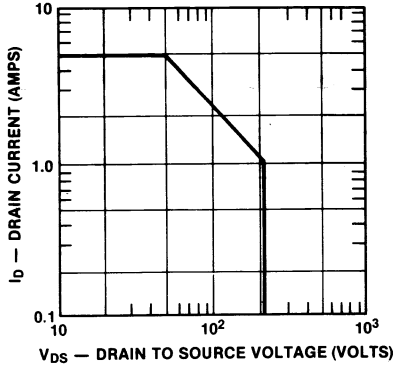


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FIGURE 6 Series Equivalent Input Impedance vs. Frequency

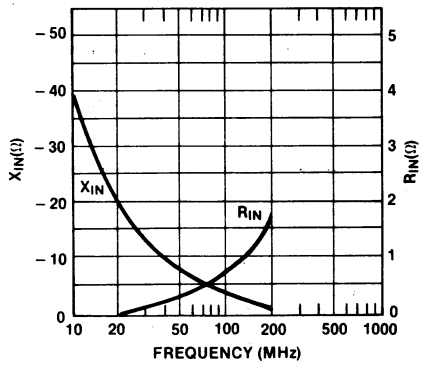
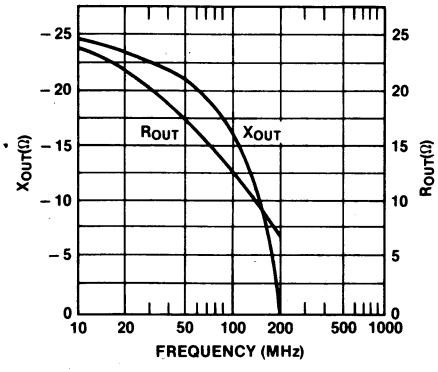
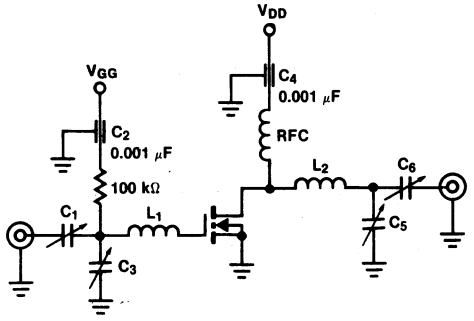


FIGURE 7 Series Equivalent Output Impedance vs. Frequency



RF TEST FIXTURES

FIGURE 8 175 MHz Test Fixture



PARTS LIST
C_1, C_3, C_5, C_6, ARCO #462, 5 TO 80 pF TRIMMER CAPACITORS
L_1, L_2, 1 1/2 TURNS #12 AWG AIR WOUND, 5/16" IN DIA.
RFC, 10-TURNS #20 AWG ENAMEL ON 1/4" DIA., CLOSE WOUND

FIGURE 9 Typical Power Out vs. Power In

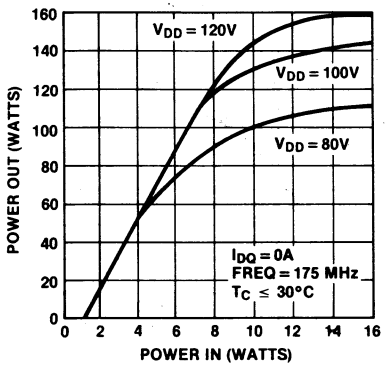
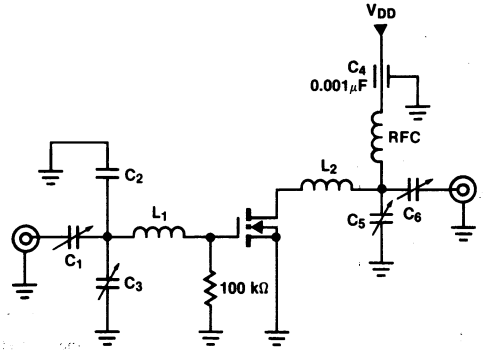
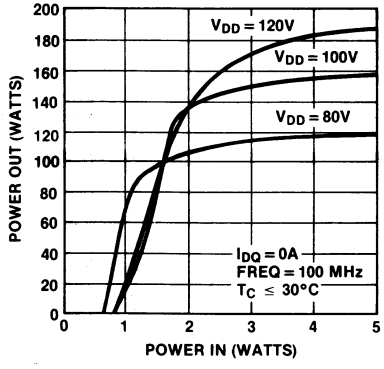


FIGURE 10 100 Volt VNR 100 MHz Test Fixture



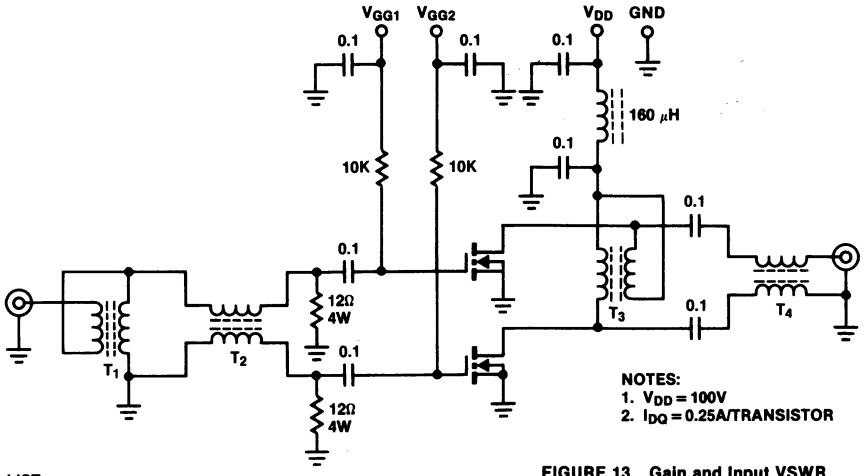
C_1, C_5, C_6 ARCO #462 5 TO 80 pF TRIMMER CAPACITOR
C_2, 30 pF SEMCO POWER CAPACITOR
C_3, ARCO #422 4 TO 40 pF TRIMMER CAPACITOR
RFC, 13-TURNS #18 AWG CLOSE WOUND ON 0.3" DIA.
L_1, 3-TURNS #12 AWG ON 0.3" DIA.
L_2, 5-TURNS #12 AWG ON 0.3" DIA.

FIGURE 11 Power Out vs. Power In



APPLICATIONS

FIGURE 12 2-30 MHz Linear Amplifier



PARTS LIST

T_1 4:1 TRANSFORMER
4 TURNS OF TWO 50Ω COAX IN PARALLEL THROUGH SIX INDIANA GENERAL FERRITE CORES PN F627-8-Q1

T_2 12.5Ω BALUN
2 TURNS OF FOUR 50Ω COAX IN PARALLEL THROUGH SIX INDIANA GENERAL FERRITE CORES PN F627-8-Q1

T_3 4:1 TRANSFORMER
4 TURNS OF TWO 50Ω COAX IN PARALLEL THROUGH SIX INDIANA GENERAL FERRITE CORES PN F627-8-Q1

T_4 50Ω BALUN
6 TURNS OF 50Ω COAX THROUGH SIX INDIANA GENERAL FERRITE CORES PN F627-8-Q1

FIGURE 13 Gain and Input VSWR vs. Frequency

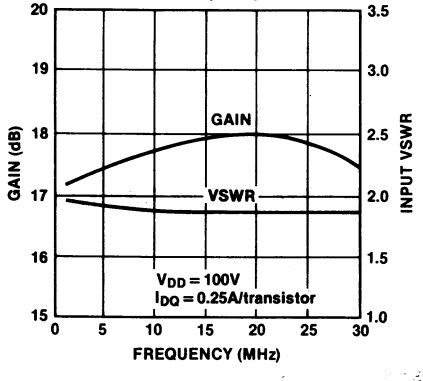


FIGURE 14 Intermodulation Ratio vs. Output Power (30 MHz)

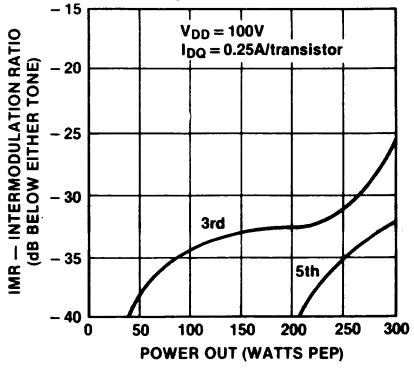
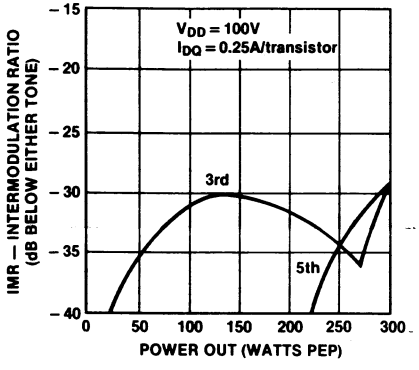


FIGURE 15 Intermodulation Ratio vs. Output Power (2 MHz)



CAUTION: Beryllium Oxide — The top cap of this device is alumina which is harmless. However, the ceramic portion between the leads and the metal flange is Beryllium Oxide, the dust of which is toxic. Care must therefore be taken during handling and mounting the device to prevent any damage to this area.

Steps must be taken to ensure that all those who may handle, use, or dispose of this device are aware of its nature and of these necessary safety precautions. In particular the transistor should never be thrown out with general industrial or domestic waste.