# DVD120T

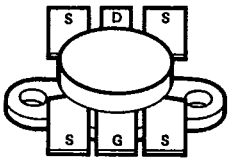
# 100V RF Power FET

## 175 MHz 120 W
## 80-120 V 10 dB

### FEATURES

- 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

## 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 ..1.2° 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 | 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 | | 600 | nA | $V_{GS}$=40V, $V_{DS}$=0V |
| $g_m$[1] | D.C. Forward Transconductance | 0.9 | | Mho | $V_{DS}$=50V, $I_D$=3A, $\Delta V_{GS}$=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 | | dB | $V_{DD}$=100V, $V_{GS}$=0V, $P_o$=120W, f=175 MHz |
| $\eta$ | Drain Efficiency | 55 | | % | $V_{DD}$=100V, $P_o$=120W f=175 MHz, $V_{GS}$=0V |
| $V_{SWR}$ | Load Mismatch Tolerance | 20:1 | | | $V_{DD}$=100V, $P_o$=120W f=175 MHz, $V_{GS}$=0 |

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

# TYPICAL PERFORMANCE CURVES

FIGURE 1 Transfer Characteristics

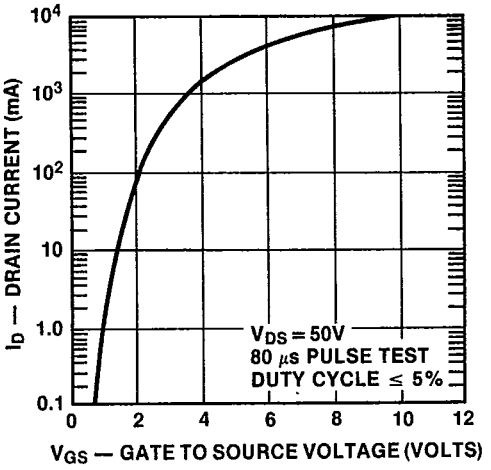



FIGURE 2 Output Characteristics

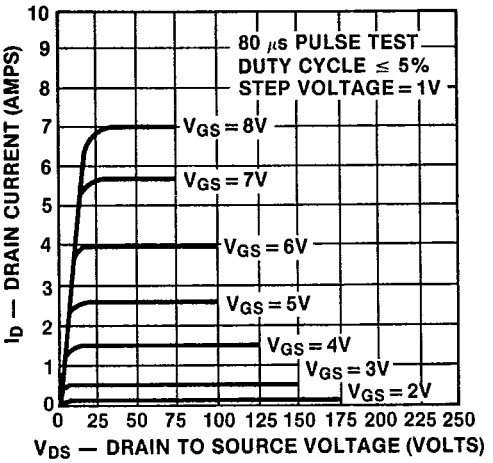



FIGURE 3 Transconductance vs. Drain Current

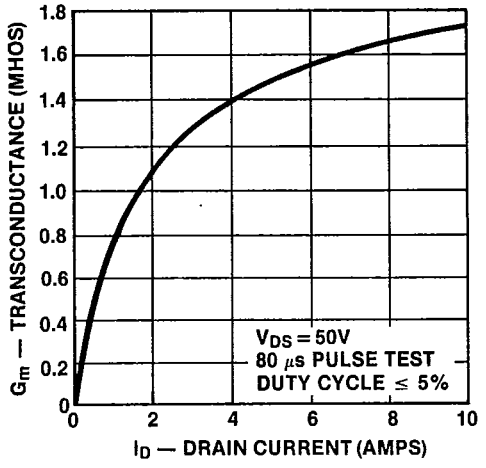



FIGURE 4. MTTF vs Junction Temperature

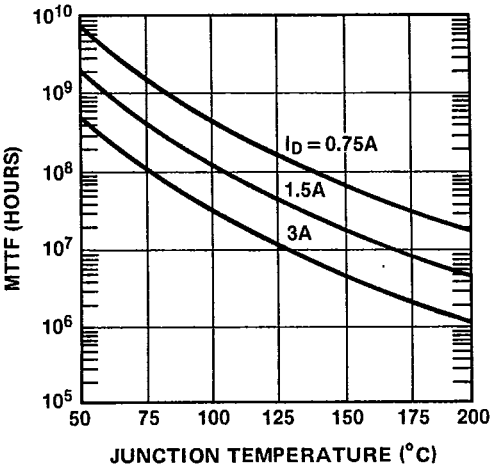



FIGURE 5 DC Safe Operating Region

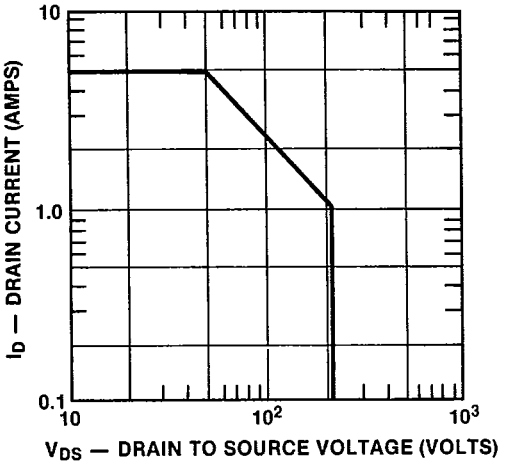


FIGURE 6 Series Equivalent Input Impedance vs. Frequency

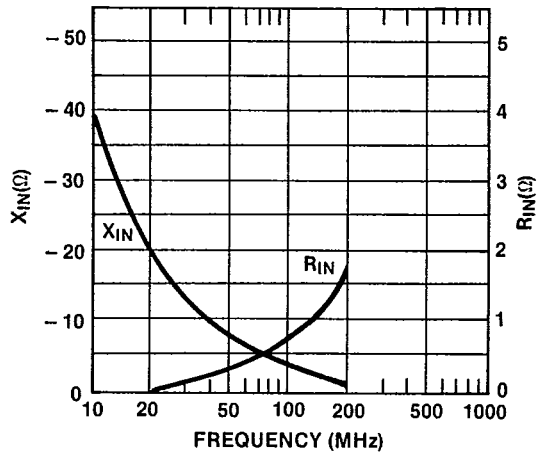
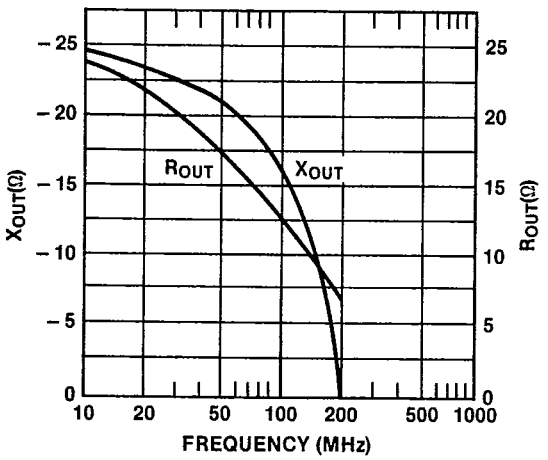
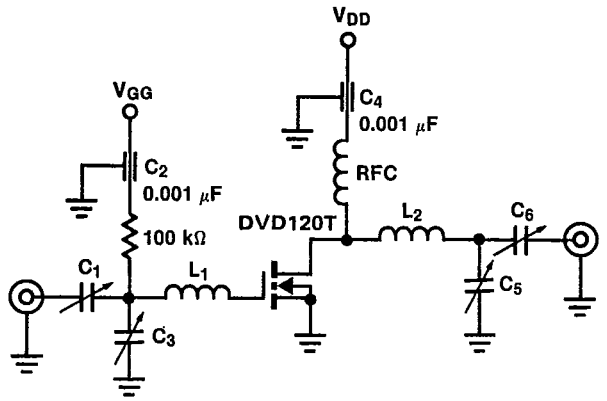



FIGURE 7 Series Equivalent Output Impedance vs. Frequency




## 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

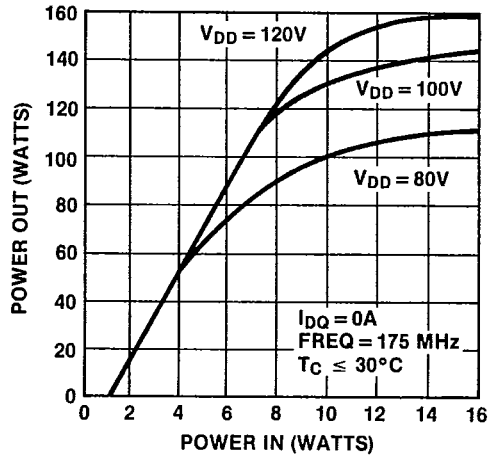
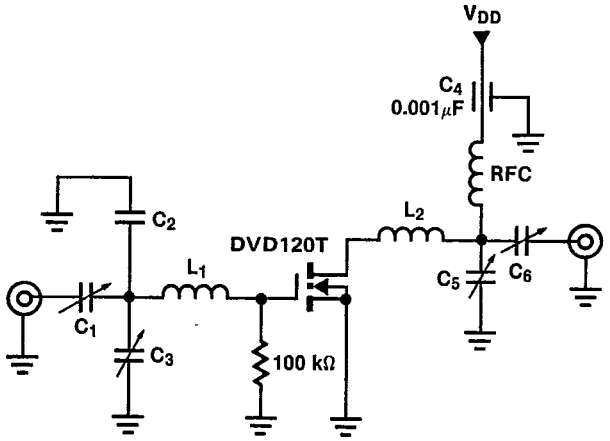
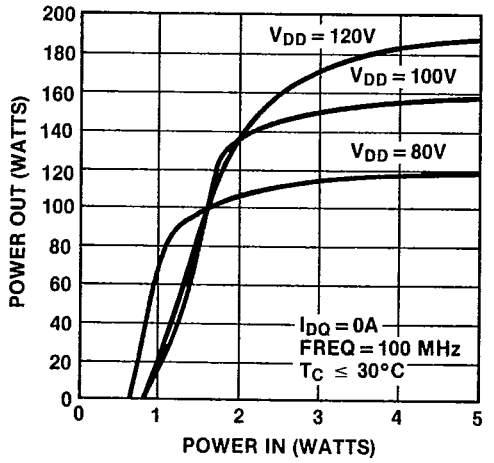



FIGURE 10 100 MHz Test Fixture



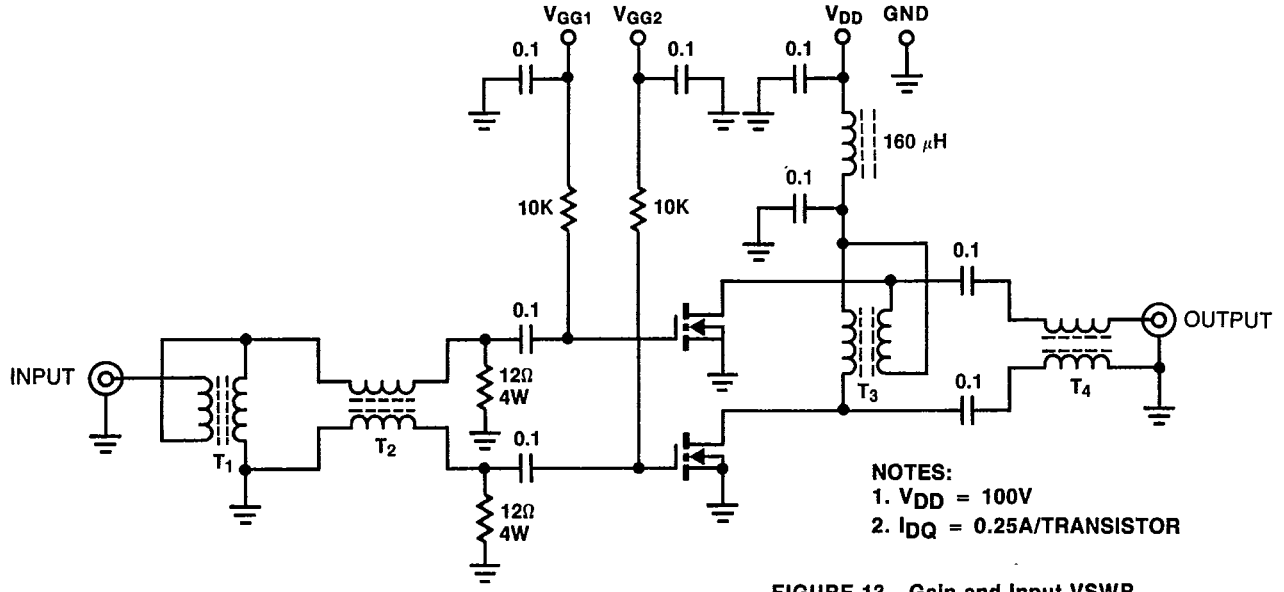

$C_1$, $C_5$, $C_6$ ARCO #462 5 TO 80 pF TRIMMER CAPACITOR
$C_2$, 30 pF
$C_3$, ARCO #422 4 TO 40 pF TRIMMER CAPACITOR
RFC, 13-TURNS #18 AWG CLOSE WOUND ON 0.3" DIA.
$L_1$, 3-TURNS #12 AWG ON 0.3" DIA.
$L_2$, 5-TURNS #12 AWG ON 0.3" DIA.

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

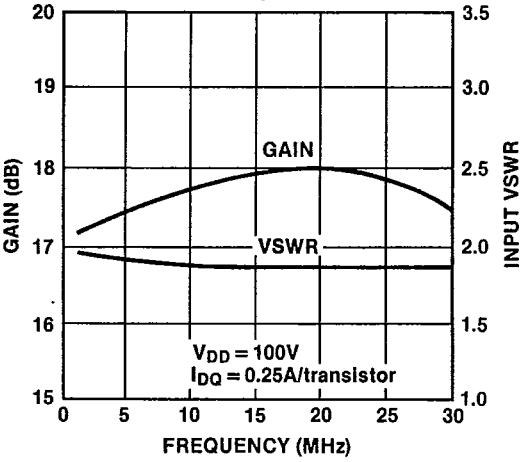



FIGURE 14 Intermodulation Ratio vs. Output Power (30 MHz)

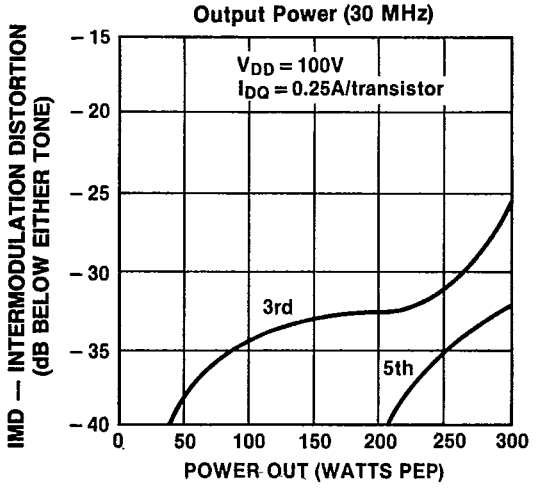
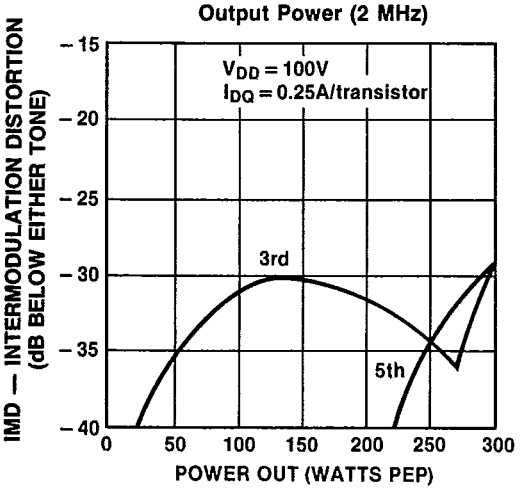



FIGURE 15 Intermodulation Distortion vs. Output Power (2 MHz)




**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.