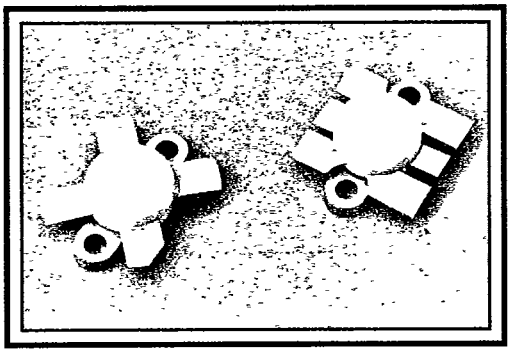
# N-CHANNEL ENHANCEMENT-MODE RF POWER FETs
# DV2860T, DV2860U

M/A-COM PHI, INC.

The DV2860 is a VMOS N-channel enhancement mode RF power FET. This 60W device is ideal for high power final amplifier applications, push-pull or single ended, from DC to 200 MHz. The rugged VMOS structure has been proven for many years in military field applications all over the world. This RF power FET features high input impedance for easier circuit design and a baseband noise floor several orders of magnitude below an equivalent bipolar transistor.



"U" Package "T" Package

## FEATURES

- 20:1 VSWR
- NO THERMAL RUNAWAY
- BROADBAND CAPABILITY
- CLASS A, B, C, D, E
- LOW NOISE FIGURE
- HIGH DYNAMIC RANGE
- SIMPLE BIAS CIRCUITRY

## ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Gate-Source Voltage | $V_{gs}$ | 20 | $V_{dc}$ |
| Drain-Source Voltage | $V_{ds}$ | 80 | $V_{dc}$ |
| Drain-Gate Voltage | $V_{dg}$ | 80 | $V_{dc}$ |
| Drain Current (DC) | $I_d$ | 6 | A |
| Total Device Dissipation @ 25°C | $P_d$ | 100 | W |
| Thermal Resistance, Junction to Case | $\theta_{jc}$ | 1.8 | °C/W |
| Junction Temperature | $T_j$ | 200 | °C |
| Storage Temperature Range | $T_{stg}$ | −65 to +150 | °C |

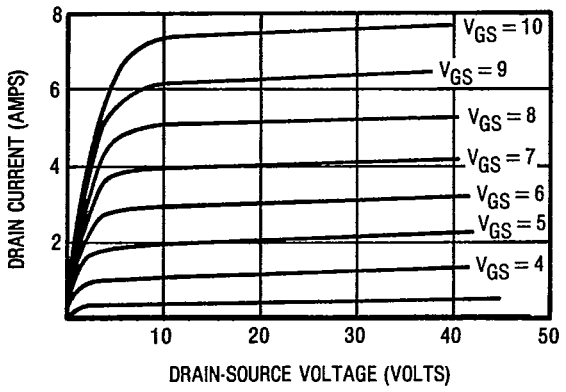
## ELECTRICAL CHARACTERISTICS AT 25°C

| Parameter | Symbol | Min. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{dss}$ | 80 | — | $V_{dc}$ | $V_{gs}=0V$, $I_d=15$ mA |
| Drain-Source Leakage Current | $I_{dss}$ | — | 3 | mA | $V_{gs}=0V$, $V_{ds}=30V$ |
| Gate-Source Leakage Current | $I_{gss}$ | — | 300 | nA | $V_{gs}=20V$, $V_{ds}=0V$ |
| DC Forward Transconductance[1] | $g_m$ | 0.6 | — | mho | $V_{ds}=10V$, $I_d=4A$, $\Delta V_{gs}=1.0V$ |
| On-State Drain Source Resistance | $R_{ds(on)}$ | — | 0.5 | Ω | $V_{gs}=20V$, $I_d=1A$ |
| Gate Threshold Voltage | $V_{gs(th)}$ | 2 | 6 | $V_{dc}$ | $V_{ds}=10V$, $I_{ds}=300$ mA |
| Common-Source Input Capacitance | $C_{iss}$ | — | 145 | pF | $V_{gs}=0V$, $V_{ds}=30V$, $f=1.0$ MHz |
| Common-Source Output Capacitance | $C_{oss}$ | — | 98 | pF | $V_{gs}=0V$, $V_{ds}=30V$, $f=1.0$ MHz |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 24 | pF | $V_{gs}=0V$, $V_{ds}=30V$, $f=1.0$ MHz |
| Common-Source Power Gain | $G_{ps}$ | 10 | — | dB | $V_{dd}=28V$, $P_o=60W$, $f=175$ MHz, $I_{dq}=0.3A$ |
| Drain Efficiency | $\eta$ | 60 | — | % | $V_{dd}=28V$, $P_o=60W$, $f=175$ MHz, $I_{dq}=0.3A$ |
| Load Mismatch Tolerance | VSWR | 20:1 | — | — | $V_{dd}=28V$, $P_o=60W$, $f=175$ MHz, $I_{dq}=0.3A$ |

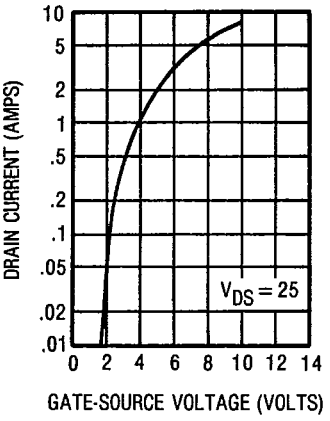
NOTE 1: Pulse Test — 80μs to 300μs, 1% duty cycle.

## TYPICAL DC PERFORMANCE

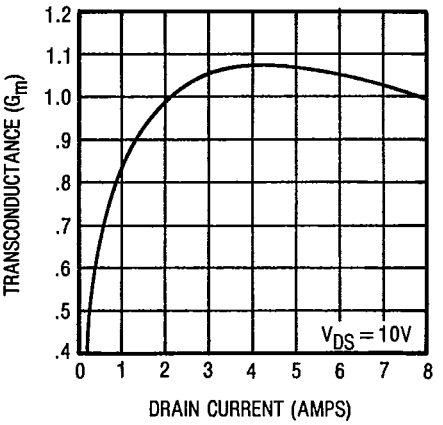
### DC Output Characteristic




### DC Transfer Characteristics

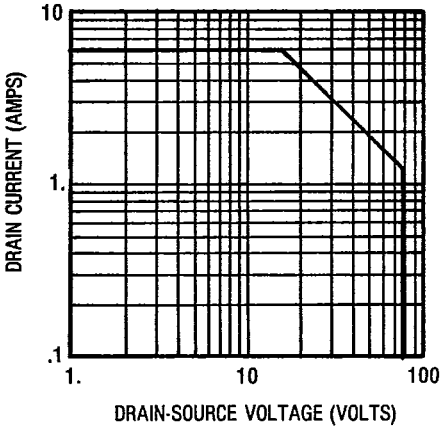



### DC Transconductance vs. Drain Current

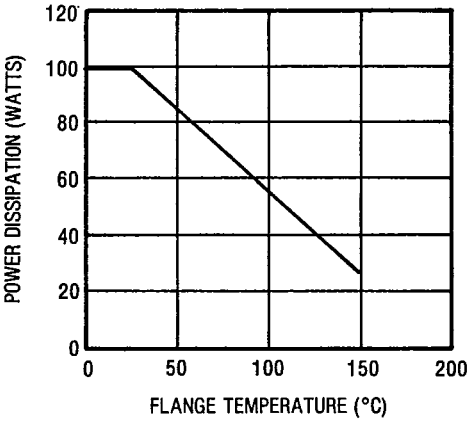



## THERMAL DATA

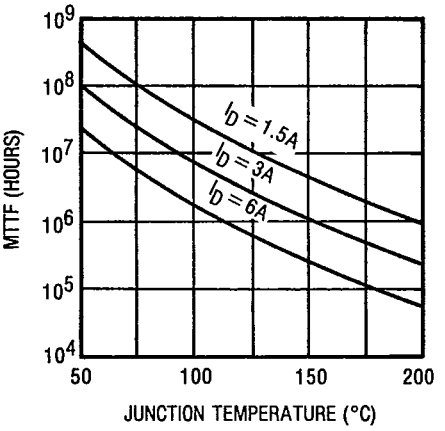
### DC & Inductive Safe Operating Region




### Power Dissipation vs. Flange Temp.

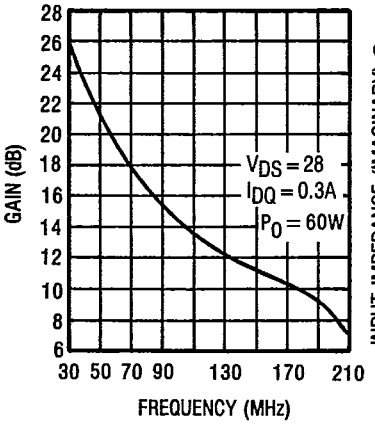



### MTTF vs. Temperature

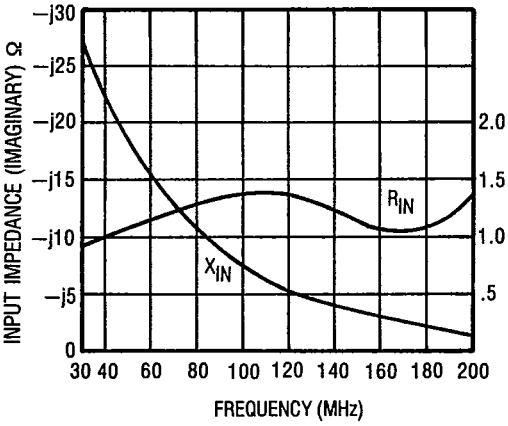



## TYPICAL RF PERFORMANCE

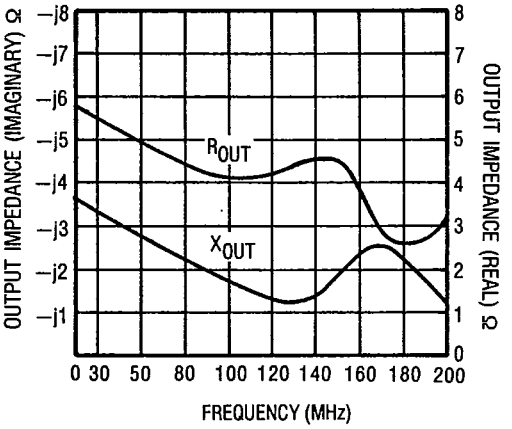
### Gain vs. Frequency




### Input Impedance vs. Frequency

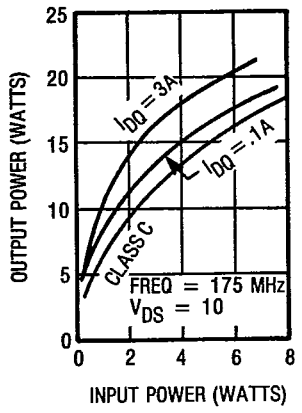



### Output Impedance vs. Frequency

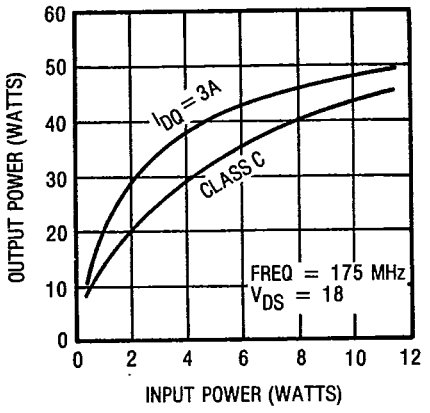


## RF PERFORMANCE vs. SUPPLY VOLTAGE

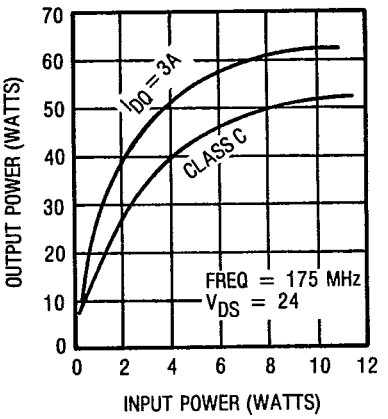
### Output Power vs. Drive Level at 10V



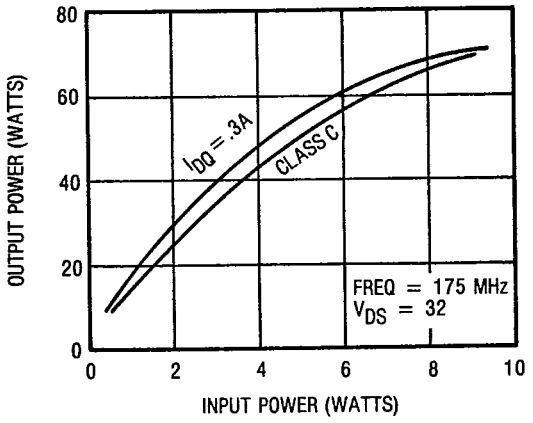

### Output Power vs. Drive Level at 18V



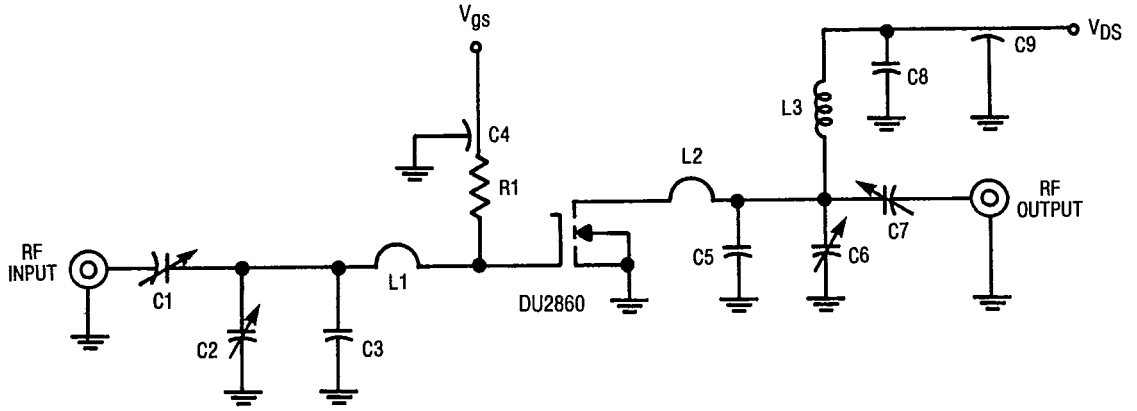

### Output Power vs. Drive Level at 24V




### Output Power vs. Drive Level at 32V




## 175 MHz TEST FIXTURE




| | | | |
|---|---|---|---|
| C1, C2, C6 | ARCO 423 OR EQUIV (7-100pF) | L1, L2 | UPSIDE DOWN "U" SHAPE, 7/16" HIGH, 7/16" LONG #18 AWG |
| C3, C5 | 50 pF | L3 | 8T #18 ENAMELED WIRE, CLOSE-WOUND ON |
| C4, C9 | 1000 pF FEED THRU | | ¼" COIL FORM. (.3 μh) |
| C7 | ARCO 463 OR EQUIV. (9-180 pF) | | |
| C8 | 1000 pF | | |
| R1 | 10K ¼W | | |