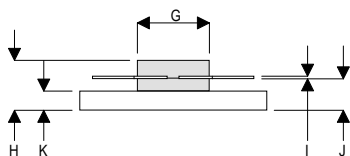
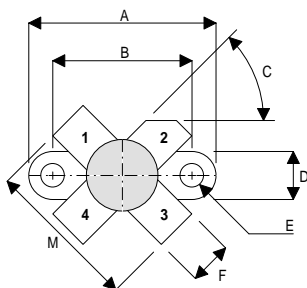


MECHANICAL DATA



DA

PIN 1 SOURCE                      PIN 2 DRAIN  
 PIN 3 SOURCE                      PIN 4 GATE

| DIM | mm    | Tol. | Inches    | Tol.  |
|-----|-------|------|-----------|-------|
| A   | 24.76 | 0.13 | 0.975     | 0.005 |
| B   | 18.42 | 0.13 | 0.725     | 0.005 |
| C   | 45°   | 5°   | 45°       | 5°    |
| D   | 6.35  | 0.13 | 0.25      | 0.005 |
| E   | 3.17  | 0.13 | 0.125 DIA | 0.005 |
| F   | 5.71  | 0.13 | 0.225     | 0.005 |
| G   | 9.52  | 0.13 | 0.375     | 0.005 |
| H   | 6.60  | REF  | 0.260     | REF   |
| I   | 0.13  | 0.02 | 0.005     | 0.001 |
| J   | 4.32  | 0.13 | 0.170     | 0.005 |
| K   | 2.54  | 0.13 | 0.100     | 0.005 |
| M   | 20.32 | 0.25 | 0.800     | 0.010 |

**GOLD METALLISED  
 MULTI-PURPOSE SILICON  
 DMOS RF FET  
 20W – 50V – 175MHz  
 SINGLE ENDED**

**FEATURES**

- SIMPLIFIED AMPLIFIER DESIGN
- SUITABLE FOR BROAD BAND APPLICATIONS
- LOW  $C_{rss}$
- SIMPLE BIAS CIRCUITS
- LOW NOISE
- HIGH GAIN – 16 dB MINIMUM

**APPLICATIONS**

- HF/VHF COMMUNICATIONS  
 from 1 MHz to 175 MHz

**ABSOLUTE MAXIMUM RATINGS** ( $T_{case} = 25^{\circ}C$  unless otherwise stated)

|              |  |                         |
|--------------|--|-------------------------|
| $P_D$        | Power Dissipation                      | 50W                     |
| $BV_{DSS}$   | Drain – Source Breakdown Voltage       | 125V                    |
| $BV_{GSS}$   | Gate – Source Breakdown Voltage        | $\pm 20V$               |
| $I_{D(sat)}$ | Drain Current                          | 3A                      |
| $T_{stg}$    | Storage Temperature                    | $-65$ to $150^{\circ}C$ |
| $T_j$        | Maximum Operating Junction Temperature | $200^{\circ}C$          |

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## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25°C unless otherwise stated)

| Parameter   | Test Conditions  | Min. | Typ. | Max. | Unit |
|---|--|------|------|------|------|
| B <sub>V</sub> DSS<br>Drain–Source Breakdown Voltage  | V <sub>GS</sub> = 0      I <sub>D</sub> = 100mA                | 125  |      |      | V    |
| I <sub>D</sub> DSS<br>Zero Gate Voltage Drain Current | V <sub>DS</sub> = 50V      V <sub>GS</sub> = 0                 |      |      | 1    | mA   |
| I <sub>G</sub> DSS<br>Gate Leakage Current            | V <sub>GS</sub> = 20V      V <sub>DS</sub> = 0                 |      |      | 1    | μA   |
| V <sub>GS(th)</sub><br>Gate Threshold Voltage*        | I <sub>D</sub> = 10mA      V <sub>DS</sub> = V <sub>GS</sub>   | 1    |      | 7    | V    |
| g <sub>fs</sub><br>Forward Transconductance*          | V <sub>DS</sub> = 10V      I <sub>D</sub> = 0.5A               | 0.8  |      |      | S    |
| G <sub>PS</sub><br>Common Source Power Gain           | P <sub>O</sub> = 20W   | 16   |      |      | dB   |
| η<br>Drain Efficiency                                 | V <sub>DS</sub> = 50V      I <sub>DQ</sub> = 0.1A              | 50   |      |      | %    |
| VSWR<br>Load Mismatch Tolerance                       | f = 175MHz   | 20:1 |      |      | —    |
| C <sub>iss</sub><br>Input Capacitance                 | V <sub>DS</sub> = 50V      V <sub>GS</sub> = -5V      f = 1MHz |      |      | 60   | pF   |
| C <sub>oss</sub><br>Output Capacitance                | V <sub>DS</sub> = 50V      V <sub>GS</sub> = 0      f = 1MHz   |      |      | 25   | pF   |
| C <sub>rss</sub><br>Reverse Transfer Capacitance      | V <sub>DS</sub> = 50V      V <sub>GS</sub> = 0      f = 1MHz   |      |      | 1.5  | pF   |

\* Pulse Test:    Pulse Duration = 300 μs , Duty Cycle ≤ 2%

## HAZARDOUS MATERIAL WARNING

The ceramic portion of the device between leads and metal flange is beryllium oxide. Beryllium oxide dust is highly toxic and care must be taken during handling and mounting to avoid damage to this area.

**THESE DEVICES MUST NEVER BE THROWN AWAY WITH GENERAL INDUSTRIAL OR DOMESTIC WASTE.**

## THERMAL DATA

|                       |                                    |                |
|-----------------------|------------------------------------|----------------|
| R <sub>THj-case</sub> | Thermal Resistance Junction – Case | Max. 3.5°C / W |
|-----------------------|------------------------------------|----------------|

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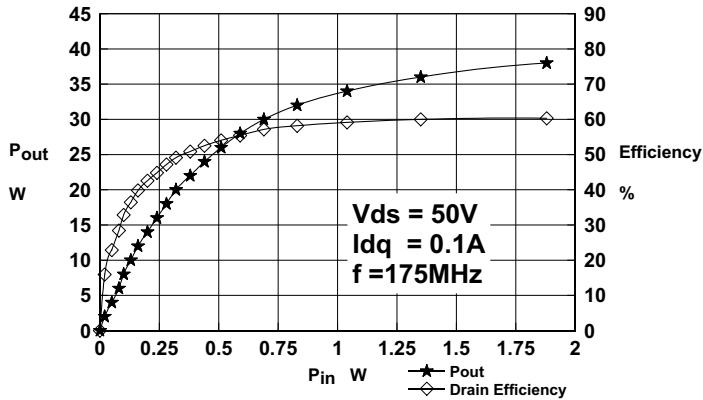


Figure 1

Power Output and Efficiency vs. Power input

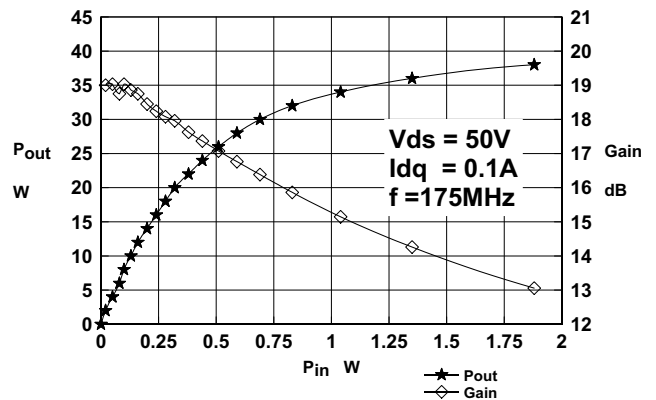


Figure 2

Power Output and Gain vs Power Input

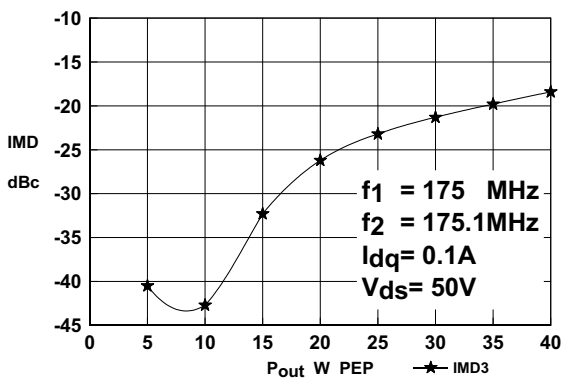


Figure 3

IMD3 vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

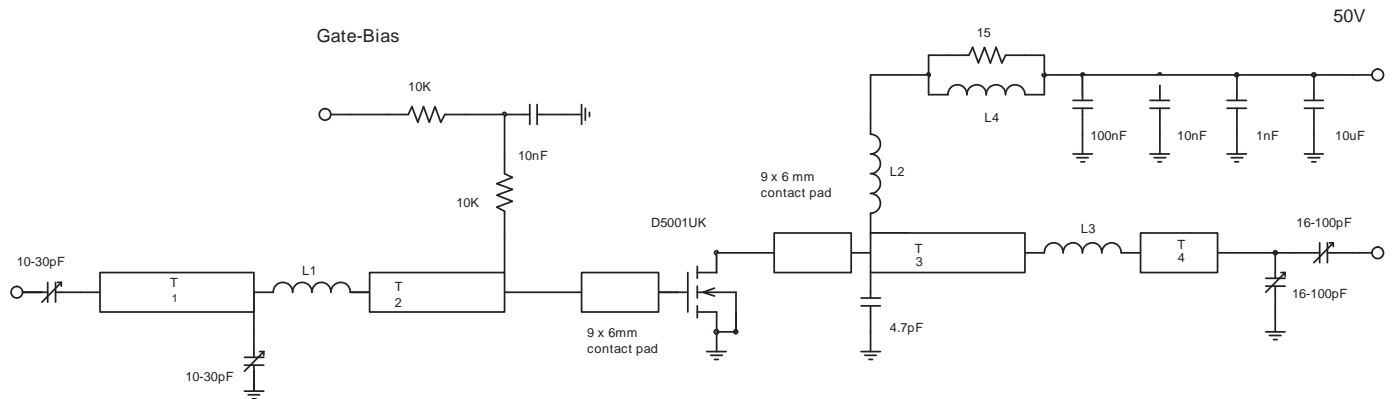
| Frequency<br>MHz | Z <sub>S</sub><br>Ω | Z <sub>L</sub><br>Ω |
|------------------|---------------------|---------------------|
| 175              | 9.5 + j14.1         | 12.3 + j10.2        |

Typical S Parameters

! Vds=50V Idq=0.1A  
 # MHZ S MA R 50

| !Freq<br>!Mhz | S11   |        | S21   |       | S12   |       | S22   |        |
|---------------|-------|--------|-------|-------|-------|-------|-------|--------|
|               | mag   | ang    | mag   | ang   | mag   | ang   | mag   | ang    |
| 30            | 0.85  | -108.7 | 9.765 | 172.5 | 0.018 | 69.9  | 0.726 | -69.2  |
| 40            | 0.846 | -109.8 | 9.588 | 163.6 | 0.019 | 65.8  | 0.718 | -70.1  |
| 50            | 0.84  | -111.2 | 9.473 | 154.9 | 0.019 | 60.2  | 0.709 | -71.2  |
| 60            | 0.837 | -113.1 | 8.991 | 146.1 | 0.02  | 55.2  | 0.699 | -72.6  |
| 70            | 0.835 | -116   | 8.521 | 139.2 | 0.021 | 50.7  | 0.689 | -74.4  |
| 80            | 0.833 | -118   | 8.104 | 134.4 | 0.022 | 47.6  | 0.678 | -78.1  |
| 90            | 0.831 | -120   | 7.662 | 127.9 | 0.023 | 44.6  | 0.673 | -80.6  |
| 100           | 0.829 | -123.3 | 7.304 | 122.9 | 0.023 | 42.7  | 0.671 | -83.6  |
| 110           | 0.828 | -125.2 | 6.991 | 117.8 | 0.023 | 40.5  | 0.671 | -85.3  |
| 120           | 0.825 | -127.4 | 6.732 | 114.6 | 0.023 | 40.2  | 0.669 | -87.9  |
| 130           | 0.823 | -130   | 6.406 | 109.6 | 0.023 | 39.8  | 0.665 | -88.6  |
| 140           | 0.82  | -131.9 | 6.155 | 105   | 0.022 | 39.9  | 0.664 | -89.6  |
| 150           | 0.816 | -135   | 5.868 | 100.7 | 0.021 | 40.6  | 0.663 | -91.4  |
| 160           | 0.81  | -137.6 | 5.644 | 96.3  | 0.021 | 41.9  | 0.664 | -92.6  |
| 170           | 0.807 | -139.8 | 5.305 | 91.2  | 0.02  | 44.2  | 0.665 | -94.2  |
| 180           | 0.803 | -142.8 | 4.989 | 87.4  | 0.019 | 48    | 0.665 | -96.8  |
| 190           | 0.804 | -144.7 | 4.656 | 83.5  | 0.019 | 52    | 0.667 | -98.6  |
| 200           | 0.806 | -147.3 | 4.402 | 81.1  | 0.019 | 57.2  | 0.671 | -101.2 |
| 210           | 0.803 | -149.2 | 4.09  | 79.8  | 0.019 | 62.2  | 0.672 | -103   |
| 220           | 0.808 | -151.5 | 3.989 | 78.7  | 0.02  | 68.2  | 0.671 | -103.5 |
| 230           | 0.802 | -153.1 | 3.859 | 76.5  | 0.02  | 71.6  | 0.677 | -105.6 |
| 240           | 0.807 | -155.2 | 3.717 | 74    | 0.021 | 76.1  | 0.685 | -107.9 |
| 250           | 0.811 | -156.7 | 3.57  | 71.3  | 0.022 | 79.4  | 0.687 | -109.9 |
| 260           | 0.812 | -158.9 | 3.435 | 68.4  | 0.023 | 84.1  | 0.698 | -111.9 |
| 270           | 0.814 | -160.4 | 3.336 | 65.9  | 0.025 | 87.4  | 0.706 | -113.7 |
| 280           | 0.818 | -161.7 | 3.227 | 63.2  | 0.027 | 91.3  | 0.716 | -116.2 |
| 290           | 0.823 | -164   | 3.1   | 61.1  | 0.029 | 95.1  | 0.722 | -119.2 |
| 300           | 0.828 | -165.4 | 2.986 | 58.9  | 0.032 | 97    | 0.724 | -120   |
| 310           | 0.828 | -166.3 | 2.935 | 57.3  | 0.035 | 98.2  | 0.726 | -122.1 |
| 320           | 0.829 | -168.2 | 2.879 | 54.3  | 0.038 | 97.5  | 0.735 | -123.7 |
| 330           | 0.832 | -169.5 | 2.71  | 50    | 0.04  | 96.9  | 0.743 | -125.4 |
| 340           | 0.835 | -170.9 | 2.536 | 46.9  | 0.042 | 97.3  | 0.747 | -127.4 |
| 350           | 0.838 | -171.9 | 2.395 | 45.7  | 0.044 | 97.7  | 0.756 | -130   |
| 360           | 0.843 | -173.6 | 2.266 | 44    | 0.045 | 98.3  | 0.761 | -130.8 |
| 370           | 0.843 | -174.9 | 2.117 | 43.2  | 0.048 | 100.3 | 0.767 | -133.3 |
| 380           | 0.845 | -175.5 | 2.027 | 42.7  | 0.051 | 100.7 | 0.772 | -134.4 |
| 390           | 0.852 | -176.8 | 1.986 | 43.3  | 0.055 | 101.6 | 0.779 | -137   |
| 400           | 0.857 | -178.2 | 1.969 | 42.8  | 0.059 | 102.6 | 0.788 | -138.4 |
| 410           | 0.862 | -178.9 | 1.938 | 41.7  | 0.062 | 101.6 | 0.793 | -139.8 |
| 420           | 0.862 | 179.2  | 1.91  | 39.4  | 0.066 | 99.6  | 0.797 | -141.6 |
| 430           | 0.861 | 178.7  | 1.895 | 37.1  | 0.068 | 98.7  | 0.801 | -143.8 |
| 440           | 0.873 | 177.3  | 1.844 | 33.7  | 0.07  | 97.2  | 0.809 | -145.3 |
| 450           | 0.868 | 176.3  | 1.73  | 30.5  | 0.072 | 96.9  | 0.814 | -147   |
| 460           | 0.871 | 174.9  | 1.644 | 27.8  | 0.074 | 96.8  | 0.822 | -148   |
| 470           | 0.875 | 175.2  | 1.558 | 26.8  | 0.077 | 97.3  | 0.821 | -149.6 |
| 480           | 0.875 | 174.4  | 1.485 | 26.3  | 0.08  | 96.9  | 0.83  | -150.6 |
| 490           | 0.878 | 172.8  | 1.394 | 25.7  | 0.083 | 97.1  | 0.829 | -152.2 |
| 500           | 0.882 | 171.6  | 1.332 | 26.2  | 0.086 | 96.5  | 0.841 | -153.6 |

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## D5001UK 175MHz TEST FIXTURE

**Substrate 1.6mm PTFE/glass,  $\epsilon_r = 2.5$**

**All microstrip lines  $W = 4.4\text{mm}$**

**T1 10mm**

**T2 13mm**

**T3 12mm**

**T4 4mm**

**L1 1.5 turns 22swg enamelled copper wire, 6mm id.**

**L2 10 turns 19swg enamelled copper wire, 6mm id.**

**L3 1.5 turns 22swg enamelled copper wire, 6mm id.**

**L4 13.5 turns 19swg enamelled copper wire on Siemens B64920A618x830 ferrite core**