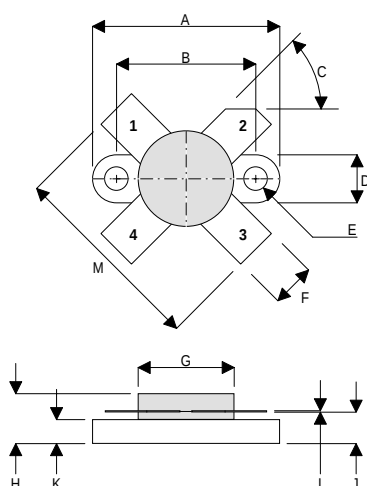


## MECHANICAL DATA



## DM

|       |        |       |       |
|-------|--------|-------|-------|
| 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 Dia. | 0.13 | 0.125 Dia. | 0.005 |
| F   | 5.71      | 0.13 | 0.225      | 0.005 |
| G   | 12.7 Dia. | 0.13 | 0.500 Dia. | 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   | 3.17      | 0.13 | 0.125      | 0.005 |
| M   | 26.16     | 0.25 | 1.03       | 0.010 |

# GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 150W – 50V – 175MHz SINGLE ENDED

## FEATURES

- SIMPLIFIED AMPLIFIER DESIGN
- SUITABLE FOR BROAD BAND APPLICATIONS
- LOW  $C_{rss}$
- SIMPLE BIAS CIRCUITS
- LOW NOISE
- HIGH GAIN – 10 dB MINIMUM

## APPLICATIONS

- HF/VHF/UHF COMMUNICATIONS  
from 1 MHz to 175 MHz

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

|              |                                        |                         |
|--------------|----------------------------------------|-------------------------|
| $P_D$        | Power Dissipation                      | 220W                    |
| $BV_{DSS}$   | Drain – Source Breakdown Voltage       | 125V                    |
| $BV_{GSS}$   | Gate – Source Breakdown Voltage        | $\pm 20V$               |
| $I_{D(sat)}$ | Drain Current                          | 18A                     |
| $T_{stg}$    | 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 |
|--------------------------------------------------|---------------------------------------------------------|------|------|------|------|
| BV <sub>DSS</sub> Drain–Source Breakdown Voltage | V <sub>GS</sub> = 0 I <sub>D</sub> = 100mA              | 125  |      |      | V    |
| I <sub>DSS</sub> Zero Gate Voltage Drain Current | V <sub>DS</sub> = 50V V <sub>GS</sub> = 0               |      |      | 6    | mA   |
| I <sub>GSS</sub> Gate Leakage Current            | V <sub>GS</sub> = 20V V <sub>DS</sub> = 0               |      |      | 1    | μA   |
| V <sub>GS(th)</sub> Gate Threshold Voltage*      | I <sub>D</sub> = 10mA V <sub>DS</sub> = V <sub>GS</sub> | 1    |      | 7    | V    |
| g <sub>fs</sub> Forward Transconductance*        | V <sub>DS</sub> = 10V I <sub>D</sub> = 3A               | 4.8  |      |      | S    |
| G <sub>PS</sub> Common Source Power Gain         | P <sub>O</sub> = 150W                                   | 10   |      |      | dB   |
| η Drain Efficiency                               | V <sub>DS</sub> = 50V I <sub>DQ</sub> = 0.6A            | 50   |      |      | %    |
| VSWR Load Mismatch Tolerance                     | f = 175MHz                                              | 20:1 |      |      | —    |
| C <sub>iss</sub> Input Capacitance               | V <sub>DS</sub> = 50V V <sub>GS</sub> = –5V f = 1MHz    |      |      | 360  | pF   |
| C <sub>oss</sub> Output Capacitance              | V <sub>DS</sub> = 50V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 150  | pF   |
| C <sub>rss</sub> Reverse Transfer Capacitance    | V <sub>DS</sub> = 50V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 9    | pF   |

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

## HAZARDOUS MATERIAL WARNING

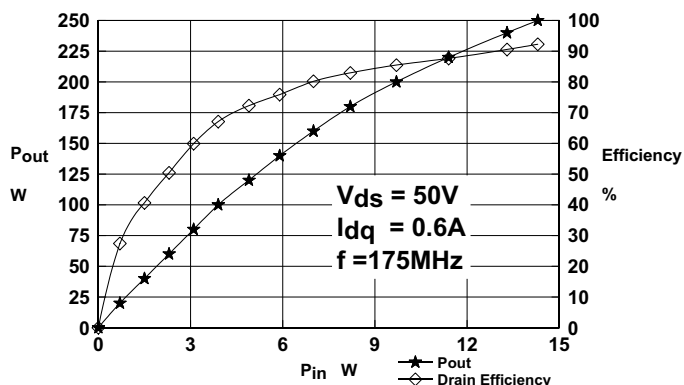
The ceramic portion of the device between leads and metal flange is beryllium oxide. Beryllium oxide dust is highly toxic and care must be taken during handling and mounting to avoid damage to this area.

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

## THERMAL DATA

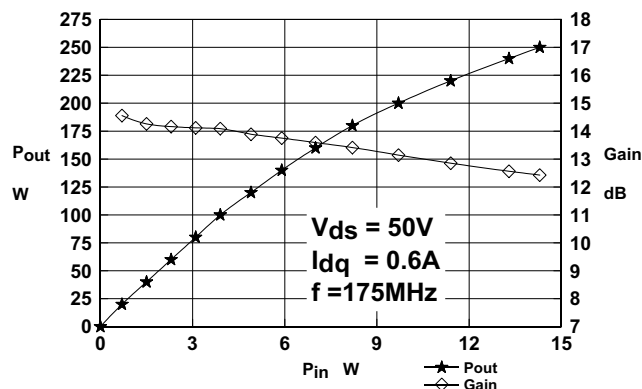
|                       |                                    |                |
|-----------------------|------------------------------------|----------------|
| R <sub>THj-case</sub> | Thermal Resistance Junction – Case | Max. 0.8°C / W |
|-----------------------|------------------------------------|----------------|

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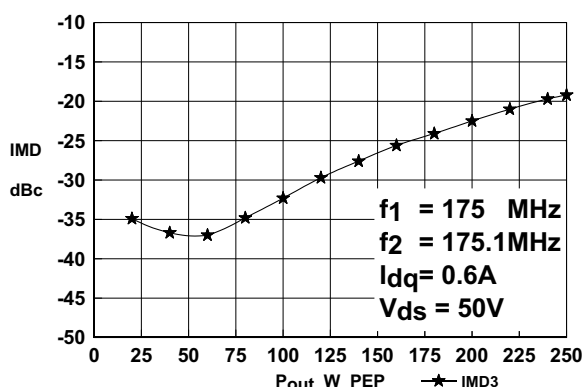
**Figure 1**

Power Output & 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 | $Z_S$<br>$\Omega$ | $Z_L$<br>$\Omega$ |
|------------------|-------------------|-------------------|
| 175              | $2.6 + j1.8$      | $4 + j1.2$        |

## Typical S Parameters

! Vds=50V Idq=0.6A  
# MHZ S MA R 50

| !Freq<br>!Mhz | S11<br>mag ang | S21<br>mag ang | S12<br>mag ang | S22<br>mag ang |
|---------------|----------------|----------------|----------------|----------------|
| 60            | 0.918 -167.2   | 5.927 98.5     | 0.01 29.1      | 0.713 -157.5   |
| 70            | 0.916 -168.2   | 5.073 91.8     | 0.01 29.2      | 0.713 -156.7   |
| 80            | 0.918 -168.7   | 4.541 86.3     | 0.009 29.3     | 0.719 -156.6   |
| 90            | 0.917 -170.3   | 3.985 79.7     | 0.009 31.5     | 0.732 -157.2   |
| 100           | 0.919 -170.8   | 3.634 75.6     | 0.009 35.2     | 0.742 -157.8   |
| 110           | 0.927 -171.8   | 3.224 69.3     | 0.008 40       | 0.762 -158.5   |
| 120           | 0.926 -172.6   | 2.933 65.4     | 0.008 45.2     | 0.771 -159.1   |
| 130           | 0.932 -173.3   | 2.612 61       | 0.008 51.9     | 0.79 -160.1    |
| 140           | 0.934 -173.7   | 2.384 57.1     | 0.009 57.5     | 0.799 -160.9   |
| 150           | 0.936 -174.8   | 2.136 52.9     | 0.009 63.2     | 0.815 -162     |
| 160           | 0.941 -175.3   | 1.968 49.7     | 0.01 67.3      | 0.827 -162.4   |
| 170           | 0.939 -176.2   | 1.766 46.3     | 0.011 72.2     | 0.837 -163.9   |
| 180           | 0.943 -177     | 1.594 43.5     | 0.011 76.4     | 0.849 -164.9   |
| 190           | 0.946 -177.5   | 1.482 42.2     | 0.012 80.5     | 0.857 -165.9   |
| 200           | 0.954 -177.8   | 1.347 39.6     | 0.013 82.4     | 0.871 -166.1   |
| 210           | 0.952 -178.8   | 1.253 39       | 0.014 85.4     | 0.881 -168     |
| 220           | 0.957 -179.3   | 1.169 37.8     | 0.016 86.8     | 0.889 -168.8   |
| 230           | 0.958 -179.4   | 1.102 36       | 0.017 87.8     | 0.891 -169.6   |
| 240           | 0.961 -179.9   | 1.019 33       | 0.018 87.9     | 0.9 -170.6     |
| 250           | 0.965 -179.2   | 0.957 31       | 0.019 88       | 0.899 -171.5   |
| 260           | 0.966 -178.9   | 0.882 29.3     | 0.02 88.9      | 0.91 -172.4    |
| 270           | 0.962 -178.2   | 0.84 28.2      | 0.021 89.9     | 0.913 -173     |
| 280           | 0.965 -177.8   | 0.786 27.1     | 0.023 90.1     | 0.922 -173.3   |
| 290           | 0.969 -177.5   | 0.733 26.7     | 0.024 91.1     | 0.927 -175.3   |
| 300           | 0.97 -176.6    | 0.703 26.6     | 0.026 90.8     | 0.93 -175.2    |
| 310           | 0.97 -176.6    | 0.669 25.3     | 0.027 90.2     | 0.934 -176.2   |
| 320           | 0.971 -175.8   | 0.638 22.5     | 0.028 88.2     | 0.938 -177.1   |
| 330           | 0.972 -175.7   | 0.598 20       | 0.029 86.7     | 0.939 -177.7   |
| 340           | 0.974 -175     | 0.559 19.2     | 0.029 86.7     | 0.944 -178.4   |
| 350           | 0.976 -175.1   | 0.516 17.8     | 0.03 87.5      | 0.944 -179.6   |
| 360           | 0.977 -173.7   | 0.486 17.3     | 0.031 88.3     | 0.95 -180      |
| 370           | 0.976 -173.3   | 0.455 17.8     | 0.032 89.6     | 0.952 -179.3   |
| 380           | 0.975 -173.4   | 0.437 18.2     | 0.034 89.8     | 0.952 -178.4   |
| 390           | 0.977 -172.8   | 0.413 18.8     | 0.035 89.5     | 0.958 -177.5   |
| 400           | 0.976 -172.2   | 0.402 20.5     | 0.037 90.4     | 0.959 -177.7   |
| 410           | 0.979 -172.2   | 0.396 19.4     | 0.039 89.6     | 0.962 -176.3   |
| 420           | 0.978 -171.6   | 0.377 17.6     | 0.04 88        | 0.962 -176.3   |
| 430           | 0.977 -171.3   | 0.362 16       | 0.04 86.3      | 0.965 -175.4   |
| 440           | 0.982 -170.7   | 0.341 14.9     | 0.041 86       | 0.966 -174.5   |
| 450           | 0.979 -170.4   | 0.327 15.1     | 0.041 86.4     | 0.966 -174.4   |
| 460           | 0.978 -170.5   | 0.31 15        | 0.042 86.5     | 0.97 -174      |
| 470           | 0.98 -169.9    | 0.3 15.9       | 0.043 87.3     | 0.967 -173.2   |
| 480           | 0.982 -169.6   | 0.289 16.3     | 0.045 87.4     | 0.972 -172.6   |
| 490           | 0.979 -169     | 0.28 16.5      | 0.046 87.7     | 0.968 -171.7   |
| 500           | 0.98 -168.8    | 0.271 16.6     | 0.047 87.4     | 0.969 -171.7   |

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**L4 12 turns 19swg enamelled copper wire on Fair-Rite FT82 ferrite core**

Issue 1