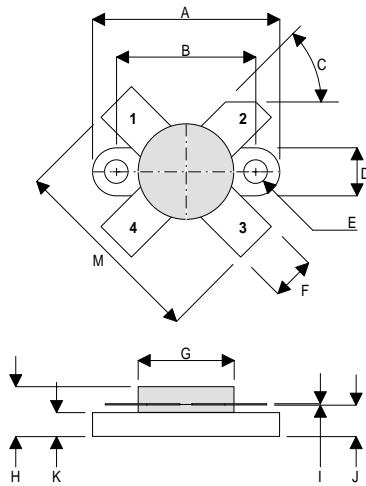


MECHANICAL DATA

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



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 |

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_{case} = 25°C unless otherwise stated)

| Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|--|------|------|------|------|
| B _V DSS Drain–Source Breakdown Voltage | V _{GS} = 0 I _D = 100mA | 125 | | | V |
| I _D DSS Zero Gate Voltage Drain Current | V _{DS} = 50V V _{GS} = 0 | | | 6 | mA |
| I _G DSS Gate Leakage Current | V _{GS} = 20V V _{DS} = 0 | | | 1 | μA |
| V _{GS(th)} Gate Threshold Voltage* | I _D = 10mA V _{DS} = V _{GS} | 1 | | 7 | V |
| g _{fs} Forward Transconductance* | V _{DS} = 10V I _D = 3A | 4.8 | | | S |
| G _{PS} Common Source Power Gain | P _O = 150W | 10 | | | dB |
| η Drain Efficiency | V _{DS} = 50V I _{DQ} = 0.6A | 50 | | | % |
| VSWR Load Mismatch Tolerance | f = 175MHz | 20:1 | | | — |
| C _{iss} Input Capacitance | V _{DS} = 50V V _{GS} = -5V f = 1MHz | | | 360 | pF |
| C _{oss} Output Capacitance | V _{DS} = 50V V _{GS} = 0 f = 1MHz | | | 150 | pF |
| C _{rss} Reverse Transfer Capacitance | V _{DS} = 50V V _{GS} = 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 _{THj-case} | Thermal Resistance Junction – Case | Max. 0.8°C / W |
|-----------------------|------------------------------------|----------------|

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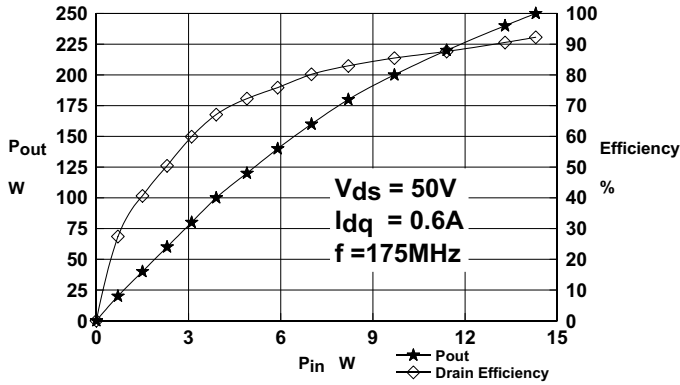


Figure 1

Power Output & Efficiency vs. Power Input

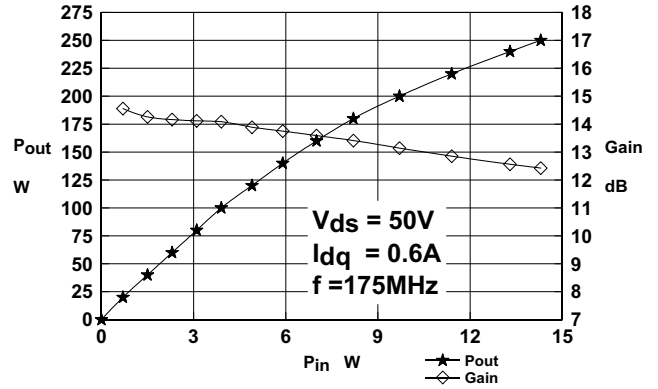


Figure 2

Power Output and Gain vs. Power Input

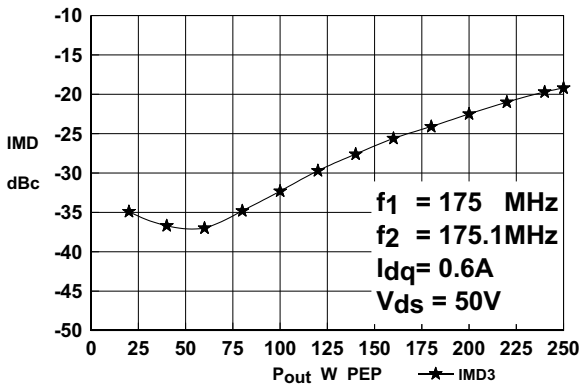


Figure 3

IMD3 vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

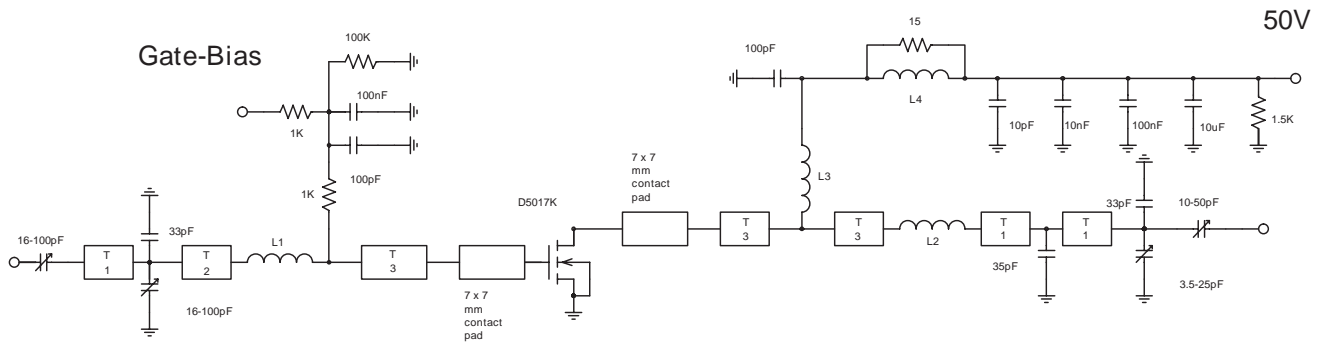
| Frequency MHz | Z _S Ω | Z _L Ω |
|------------------|---------------------|---------------------|
| 175 | 2.6 + j1.8 | 4 + j1.2 |

Typical S Parameters

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

| !Freq !Mhz | S11 | | S21 | | S12 | | S22 | |
|---------------|-------|--------|-------|------|-------|------|-------|--------|
| | mag | ang | mag | ang | mag | ang | 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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D5017UK 175MHz Test Fixture

Substrate 1.6mm PTFE/glass, Er = 2.5

All microstrip lines W= 5mm

T1 7.5mm

T2 12.5 mm

T3 6mm

L1 Hairpin loop 18 swg 10mm high, 6.5mm gap

L2 Hairpin loop 5mm wide ribbon, 7mm high, 3.5 mm gap

L3 9 turns 19swg enamelled copper wire, 6mm id.

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

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