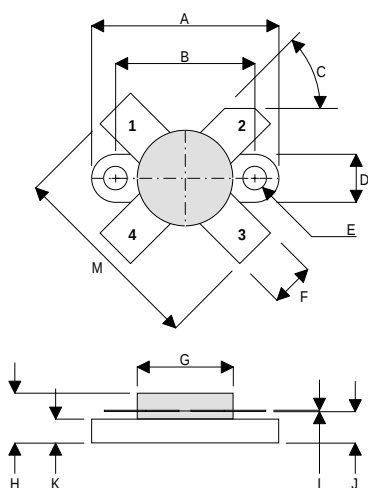


## MECHANICAL DATA

# GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 150W – 28V – 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 – 13 dB MINIMUM

## APPLICATIONS

- HF/VHF/UHF COMMUNICATIONS  
from 1 MHz to 200 MHz

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

|              |                                        |                         |
|--------------|----------------------------------------|-------------------------|
| $P_D$        | Power Dissipation                      | 220W                    |
| $BV_{DSS}$   | Drain – Source Breakdown Voltage       | 70V                     |
| $BV_{GSS}$   | Gate – Source Breakdown Voltage        | $\pm 20V$               |
| $I_{D(sat)}$ | Drain Current                          | 30A                     |
| $T_{stg}$    | Storage Temperature                    | $-65$ to $150^{\circ}C$ |
| $T_j$        | Maximum Operating Junction Temperature | $200^{\circ}C$          |

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.

## 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              | 70   |      |      | V    |
| I <sub>DSS</sub> Zero Gate Voltage Drain Current | V <sub>DS</sub> = 28V 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> = 6A               | 4.8  |      |      | S    |
| G <sub>PS</sub> Common Source Power Gain         | P <sub>O</sub> = 150W                                   | 13   |      |      | dB   |
| η Drain Efficiency                               | V <sub>DS</sub> = 28V 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> = 0V V <sub>GS</sub> = –5V f = 1MHz     |      |      | 360  | pF   |
| C <sub>oss</sub> Output Capacitance              | V <sub>DS</sub> = 28V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 180  | pF   |
| C <sub>rss</sub> Reverse Transfer Capacitance    | V <sub>DS</sub> = 28V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 15   | pF   |

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

## HAZARDOUS MATERIAL WARNING

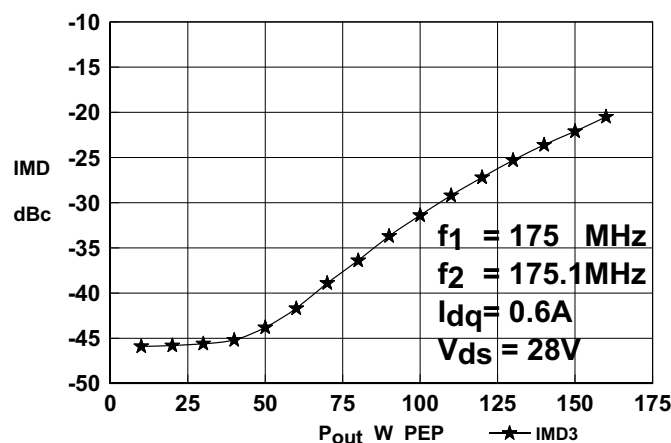
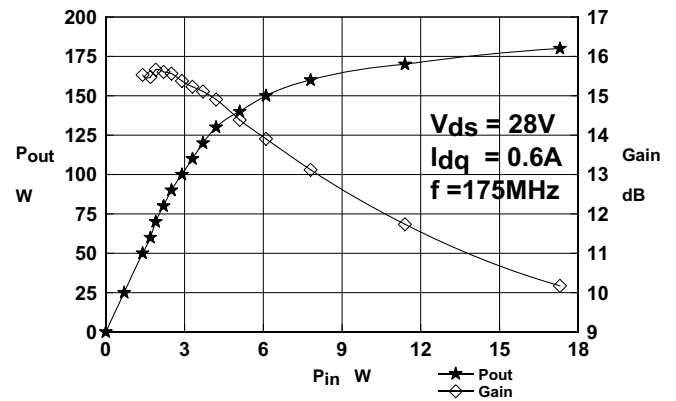
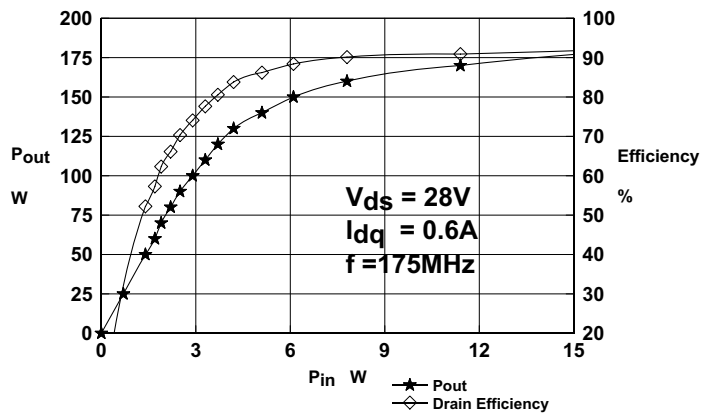
The ceramic portion of the device between leads and metal flange is beryllium oxide. Beryllium oxide dust is highly toxic and care must be taken during handling and mounting to avoid damage to this area.

**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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## Typical S Parameters

!  $V_{ds}=28V$   
# MHz S MA R 50

$I_{dq}=0.6A$

| !Freq<br>!MHz | S11<br>mag ang | S21<br>mag ang | S12<br>mag ang | S22<br>mag ang |
|---------------|----------------|----------------|----------------|----------------|
| 50            | 0.83 -167.4    | 7.42 93.3      | 0.009 26.5     | 0.79 -167      |
| 100           | 0.89 -169.4    | 3.56 64.1      | 0.008 44.1     | 0.82 -163.7    |
| 150           | 0.93 -169.3    | 2.05 45.2      | 0.01 75.4      | 0.87 -164.7    |
| 200           | 0.95 -170.1    | 1.23 34.2      | 0.016 88.2     | 0.91 -166.3    |
| 250           | 0.96 -170.2    | 0.85 26        | 0.023 89.1     | 0.94 -167.7    |
| 300           | 0.97 -169.7    | 0.62 22.6      | 0.03 90.1      | 0.96 -169      |
| 350           | 0.97 -170.4    | 0.44 15.2      | 0.035 86.1     | 0.96 -169.8    |
| 400           | 0.98 -169.3    | 0.35 17.8      | 0.043 85.2     | 0.97 -170.5    |
| 450           | 0.98 -169      | 0.27 15.9      | 0.046 84       | 0.98 -171.7    |
| 500           | 0.99 -168.5    | 0.23 19.6      | 0.053 83.1     | 0.99 -171.4    |

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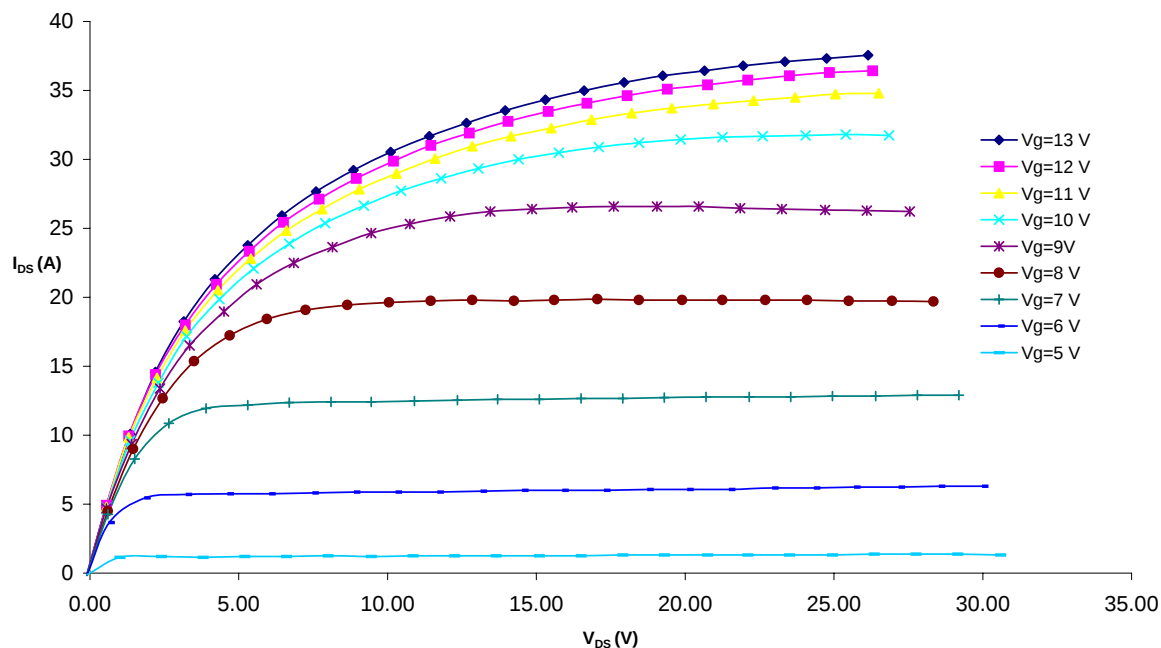


Figure 4 – Typical IV Characteristics.

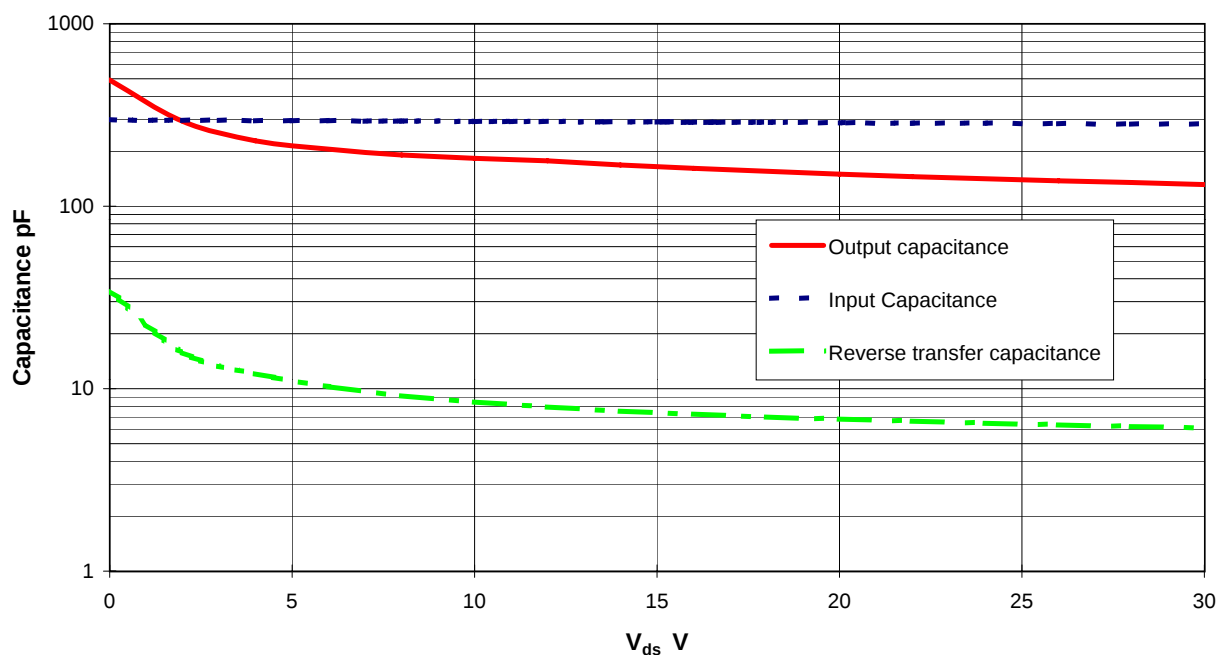
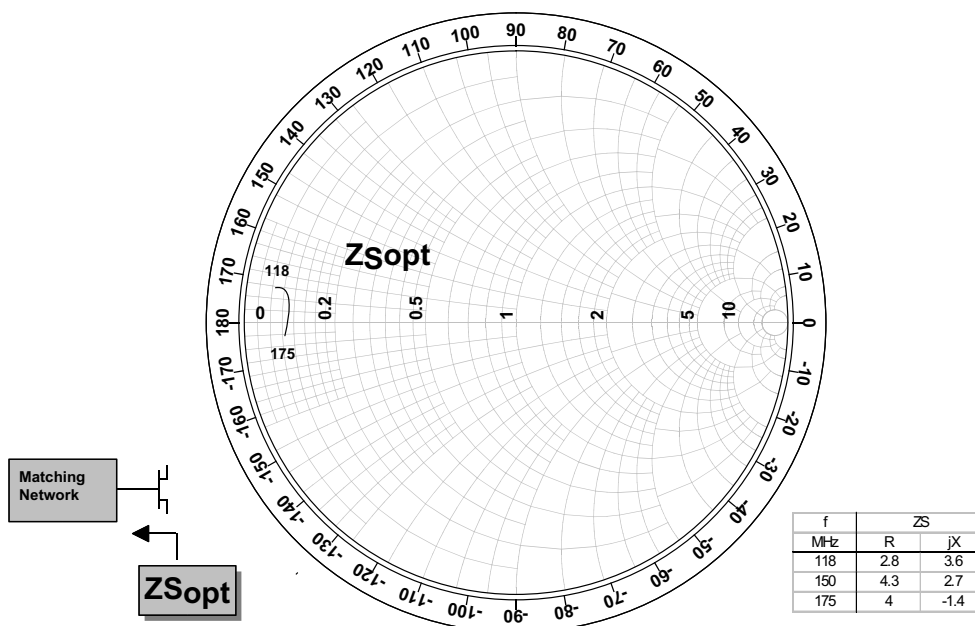
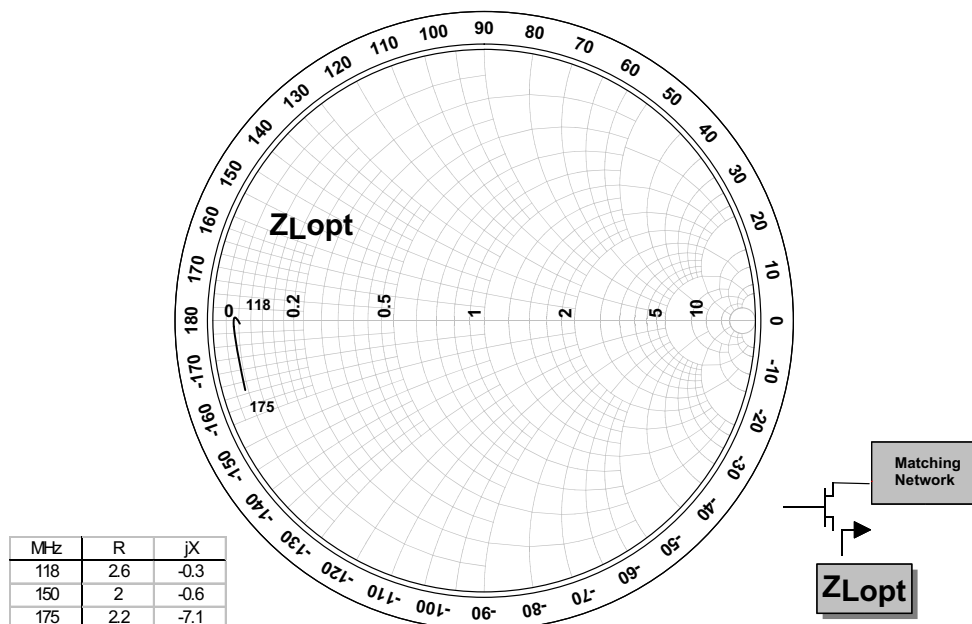
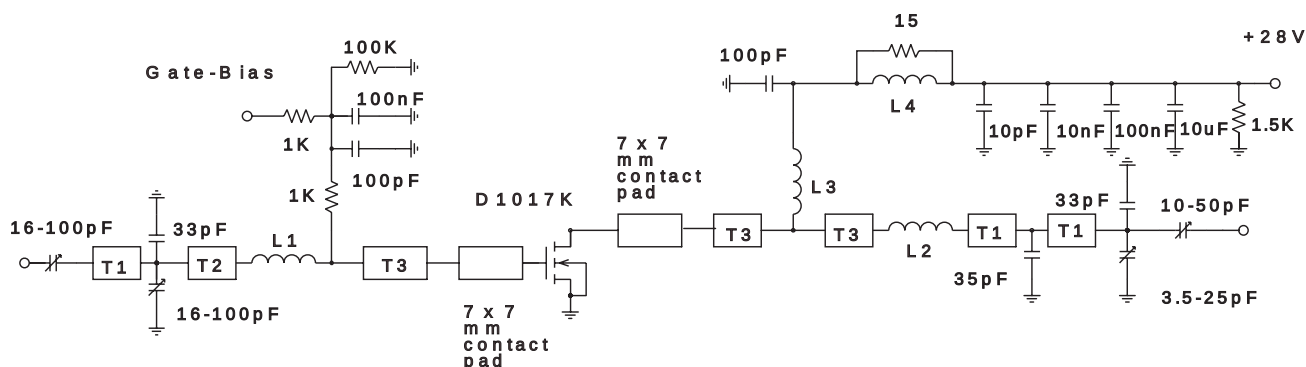


Figure 5 – Typical CV Characteristics.



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## 175MHz TEST FIXTURE

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

All microstrip lines  $W = 5\text{mm}$

T1,T2      7.5mm

T3      6mm

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

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

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

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

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