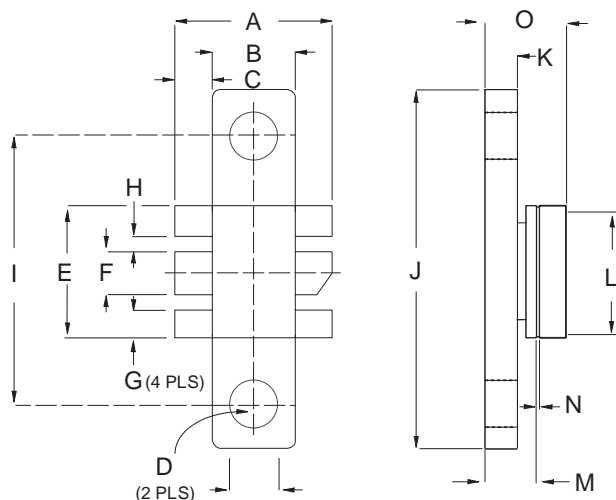


MECHANICAL DATA



SOT 171

|       |        |       |        |
|-------|--------|-------|--------|
| PIN 1 | SOURCE | PIN 2 | SOURCE |
| PIN 3 | GATE   | PIN 4 | DRAIN  |
| PIN 5 | SOURCE | PIN 6 | SOURCE |

| DIM | mm       | Tol. | Inches    | Tol.  |
|-----|----------|------|-----------|-------|
| A   | 10.92    | 0.25 | 0.430     | 0.001 |
| B   | 5.84     | 0.08 | 0.230     | 0.003 |
| C   | 2.54     | 0.08 | 0.100     | 0.003 |
| D   | 3.30 dia | 0.13 | 0.130 dia | 0.05  |
| E   | 9.14     | 0.08 | 0.360     | 0.003 |
| F   | 3.05     | 0.08 | 0.120     | 0.003 |
| G   | 2.01     | 0.08 | 0.079     | 0.003 |
| H   | 1.04     | 0.08 | 0.041     | 0.003 |
| I   | 18.42    | 0.08 | 0.725     | 0.003 |
| J   | 24.77    | 0.08 | 0.975     | 0.003 |
| K   | 2.74     | 0.08 | 0.108     | 0.003 |
| L   | 9.14     | 0.13 | 0.360     | 0.005 |
| M   | 4.19     | 0.08 | 0.165     | 0.003 |
| N   | 0.13     | 0.05 | 0.005     | 0.002 |
| O   | 7.11     | MAX  | 0.280     | MAX   |

**GOLD METALLISED  
MULTI-PURPOSE SILICON  
DMOS RF FET  
20W – 28V – 500MHz  
SINGLE ENDED**

FEATURES

- SIMPLIFIED AMPLIFIER DESIGN
- SUITABLE FOR BROAD BAND

APPLICATIONS

- VERY LOW  $C_{rss}$
- SIMPLE BIAS CIRCUITS
- LOW NOISE
- HIGH GAIN – 11 dB MINIMUM

APPLICATIONS

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

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

|              |  |              |
|--------------|--|--------------|
| $P_D$        | Power Dissipation                      | 50W          |
| $BV_{DSS}$   | Drain – Source Breakdown Voltage       | 65V          |
| $BV_{GSS}$   | Gate – Source Breakdown Voltage        | $\pm 20V$    |
| $I_{D(sat)}$ | Drain Current *                        | 6A           |
| $T_{stg}$    | Storage Temperature                    | -65 to 150°C |
| $T_j$        | Maximum Operating Junction Temperature | 200°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 |
|--|--|------|------|------|------|
| B <sub>V</sub> DSS<br>Drain–Source Breakdown Voltage | V <sub>GS</sub> = 0      I <sub>D</sub> = 10mA               | 65   |      |      | V    |
| I <sub>D</sub> SS<br>Zero Gate Voltage Drain Current | V <sub>DS</sub> = 28V      V <sub>GS</sub> = 0               |      |      | 6    | mA   |
| I <sub>G</sub> SS<br>Gate Leakage Current            | V <sub>GS</sub> = 20V      V <sub>DS</sub> = 0               |      |      | 6    | 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> = 1.2A             | 1.08 |      |      | S    |
| G <sub>PS</sub><br>Common Source Power Gain          | P <sub>O</sub> = 20W   | 11   |      |      | dB   |
| η<br>Drain Efficiency                                | V <sub>DS</sub> = 28V      I <sub>DQ</sub> = 0.6A            | 40   |      |      | %    |
| V <sub>SWR</sub><br>Load Mismatch Tolerance          | f = 500MHz   | 20:1 |      |      | —    |
| C <sub>iss</sub><br>Input Capacitance                | V <sub>DS</sub> = 0      V <sub>GS</sub> = -5V      f = 1MHz |      |      | 72   | pF   |
| C <sub>oss</sub><br>Output Capacitance               | V <sub>DS</sub> = 28V      V <sub>GS</sub> = 0      f = 1MHz |      |      | 36   | pF   |
| C <sub>rss</sub><br>Reverse Transfer Capacitance     | V <sub>DS</sub> = 28V      V <sub>GS</sub> = 0      f = 1MHz |      |      | 3    | 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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Issue 5

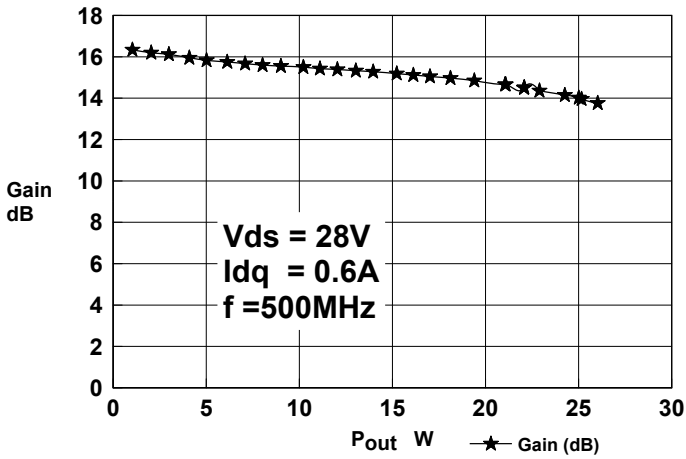


Figure 1- Gain vs. Power Output

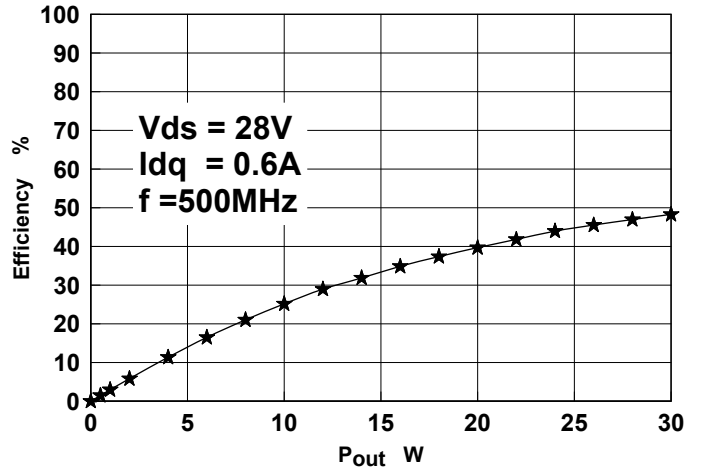


Figure 2 - Efficiency vs Power Output

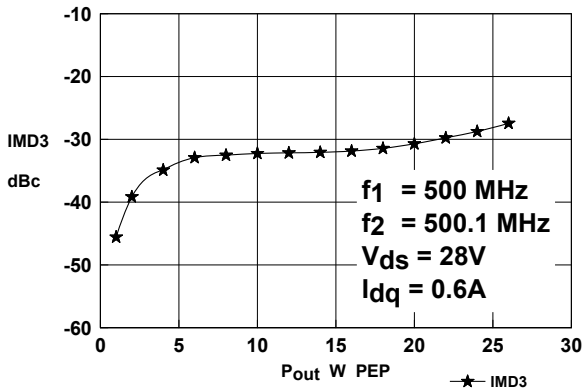


Figure 3 - IMD vs Power Output

### Typical S Parameters

! Vds=28V Idq=0.6A  
# MHz S MA R 50

| !Freq<br>!MHz | S11  |        | S21    |      | S12   |       | S22  |        |
|---------------|------|--------|--------|------|-------|-------|------|--------|
|               | mag  | ang    | mag    | ang  | mag   | ang   | mag  | ang    |
| 100           | 0.85 | -155.5 | 15.46  | 87.8 | 0.017 | -0.7  | 0.51 | -144.5 |
| 200           | 0.86 | -167.1 | 7.325  | 64.7 | 0.014 | -12.0 | 0.6  | -150.4 |
| 300           | 0.89 | -171.2 | 4.597  | 50.7 | 0.012 | -15.0 | 0.69 | -155.0 |
| 400           | 0.91 | -173.9 | 2.971  | 38.2 | 0.009 | -13.0 | 0.77 | -159.0 |
| 500           | 0.93 | -177.1 | 2.155  | 29.7 | 0.006 | 5.7   | 0.82 | -162.8 |
| 600           | 0.94 | -179.6 | 1.634  | 17.6 | 0.006 | 29.4  | 0.86 | -166.8 |
| 700           | 0.95 | 178.6  | 1.182  | 9.4  | 0.007 | 52.3  | 0.9  | -169.2 |
| 800           | 0.96 | 176.6  | 0.7884 | 5.3  | 0.009 | 65.1  | 0.92 | -172.7 |
| 900           | 0.97 | 174.7  | 0.6543 | 7.2  | 0.012 | 71.7  | 0.93 | -175.0 |
| 1000          | 0.97 | 173.2  | 0.556  | 5.7  | 0.015 | 75.0  | 0.94 | -176.6 |

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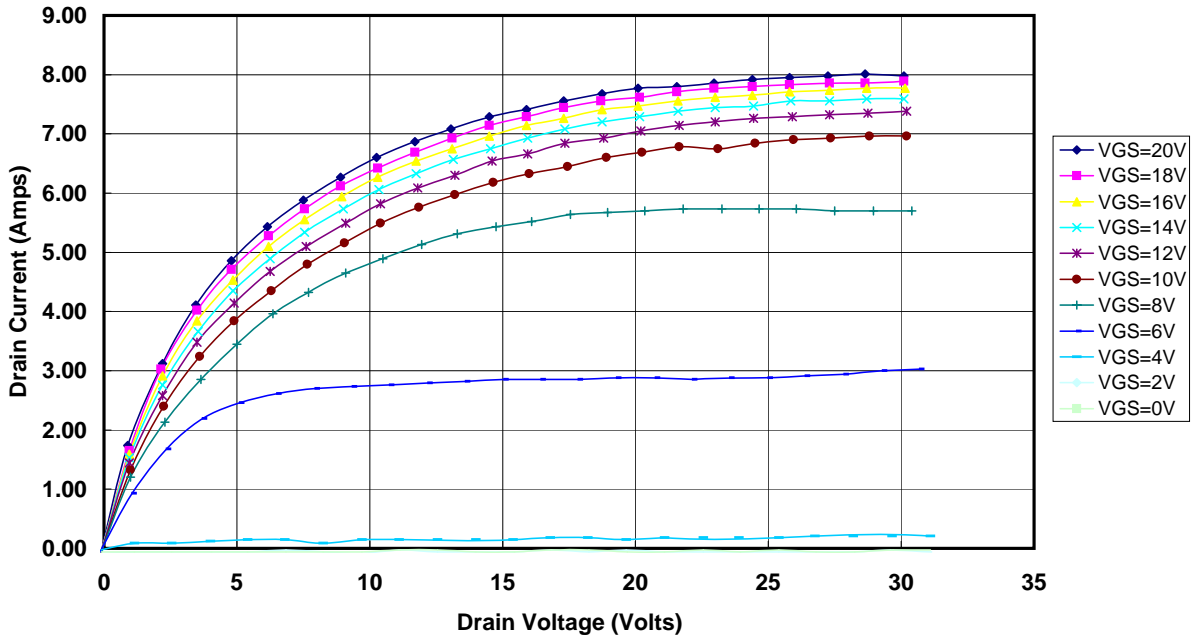


Figure 4 – Typical IV Characteristics.

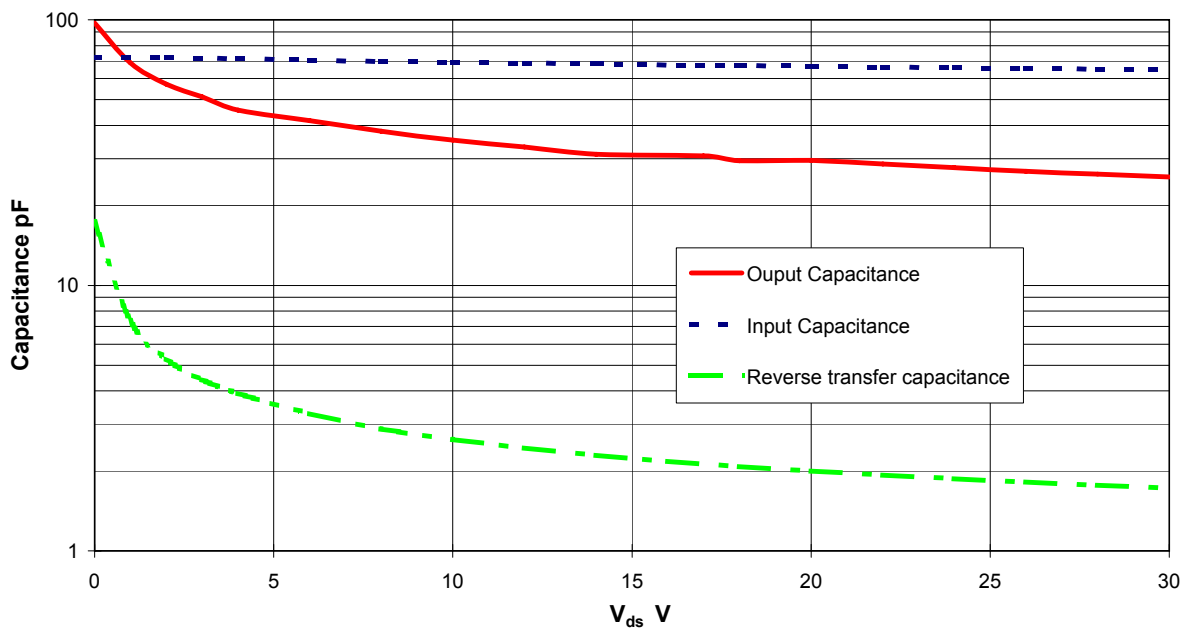
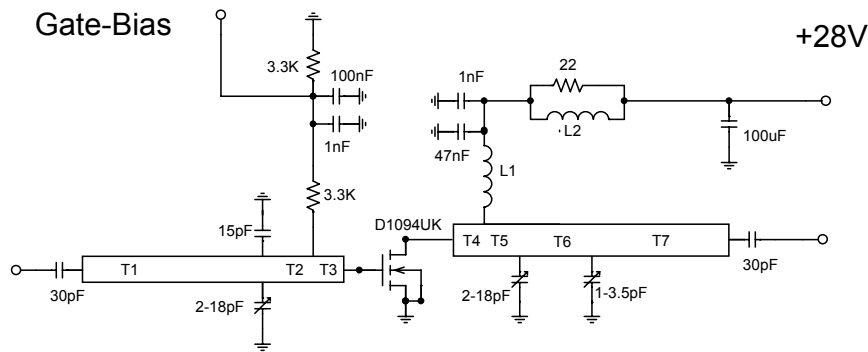


Figure 5 – Typical CV Characteristics.

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# D1094UK 500MHz TEST FIXTURE

Substrate 1.6mm thick G200

All microstrip lines W=2.8mm

T1 46.3mm

T2 2.2mm

T3, T4 8mm

T5 4.3mm

T6 11.7mm

T7 32.3mm

L1 7 turns 24swg enamelled copper wire, 3mm i.d.

L2 1.5 turns 24swg enamelled copper wire on ferrite core

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