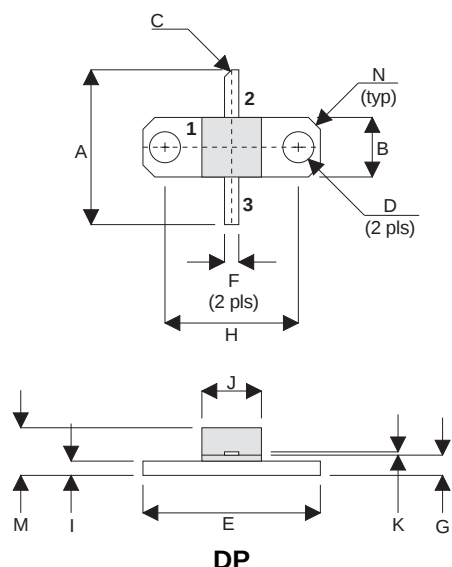


## MECHANICAL DATA



PIN 1 SOURCE PIN 2 DRAIN  
PIN 3 GATE

| DIM | mm         | Tol. | Inches      | Tol.  |
|-----|------------|------|-------------|-------|
| A   | 16.51      | 0.25 | 0.650       | 0.010 |
| B   | 6.35       | 0.13 | 0.250       | 0.005 |
| C   | 45°        | 5°   | 45°         | 5°    |
| D   | 3.30       | 0.13 | 0.130       | 0.005 |
| E   | 18.92      | 0.08 | 0.745       | 0.003 |
| F   | 1.52       | 0.13 | 0.060       | 0.005 |
| G   | 2.16       | 0.13 | 0.085       | 0.005 |
| H   | 14.22      | 0.08 | 0.560       | 0.003 |
| I   | 1.52       | 0.13 | 0.060       | 0.005 |
| J   | 6.35       | 0.13 | 0.250       | 0.005 |
| K   | 0.13       | 0.03 | 0.005       | 0.001 |
| M   | 5.08       | 0.51 | 0.200       | 0.020 |
| N   | 1.27 x 45° | 0.13 | 0.050 x 45° | 0.005 |

# GOLD METALLISED MULTI-PURPOSE SILICON DMOS RF FET 40W – 28V – 500MHz SINGLE ENDED

## FEATURES

- SIMPLIFIED AMPLIFIER DESIGN
- SUITABLE FOR BROAD BAND APPLICATIONS
- LOW  $C_{rss}$
- USEFUL  $P_O$  AT 1GHz
- LOW NOISE
- HIGH GAIN – 12 dB MINIMUM

## APPLICATIONS

- HF/VHF/UHF COMMUNICATIONS  
from 1 MHz to 500 MHz

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

|              |                                        |                         |
|--------------|----------------------------------------|-------------------------|
| $P_D$        | Power Dissipation                      | 87.5W                   |
| $BV_{DSS}$   | Drain – Source Breakdown Voltage       | 70V                     |
| $BV_{GSS}$   | Gate – Source Breakdown Voltage        | $\pm 20V$               |
| $I_{D(sat)}$ | Drain Current                          | 10A                     |
| $T_{stg}$    | Storage Temperature                    | $-65$ to $150^{\circ}C$ |
| $T_j$        | Maximum Operating Junction Temperature | $200^{\circ}C$          |

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

| Parameter                                          | Test Conditions                                         | Min. | Typ. | Max. | Unit |
|----------------------------------------------------|---------------------------------------------------------|------|------|------|------|
| B <sub>V</sub> DSS Drain–Source Breakdown Voltage  | V <sub>GS</sub> = 0 I <sub>D</sub> = 100mA              | 70   |      |      | V    |
| I <sub>D</sub> DSS Zero Gate Voltage Drain Current | V <sub>DS</sub> = 28V V <sub>GS</sub> = 0               |      |      | 2    | mA   |
| I <sub>G</sub> SS 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> = 2A               | 1.6  |      |      | S    |
| G <sub>PS</sub> Common Source Power Gain           | P <sub>O</sub> = 40W                                    | 12   |      |      | dB   |
| η Drain Efficiency                                 | V <sub>DS</sub> = 28V I <sub>DQ</sub> = 0.2A            | 50   |      |      | %    |
| VSWR Load Mismatch Tolerance                       | f = 500MHz                                              | 20:1 |      |      | —    |
| C <sub>iss</sub> Input Capacitance                 | V <sub>DS</sub> = 0 V <sub>GS</sub> = –5V f = 1MHz      |      |      | 120  | pF   |
| C <sub>oss</sub> Output Capacitance                | V <sub>DS</sub> = 28V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 60   | pF   |
| C <sub>rss</sub> Reverse Transfer Capacitance      | V <sub>DS</sub> = 28V V <sub>GS</sub> = 0 f = 1MHz      |      |      | 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. 2.0°C / W |
|-----------------------|------------------------------------|----------------|

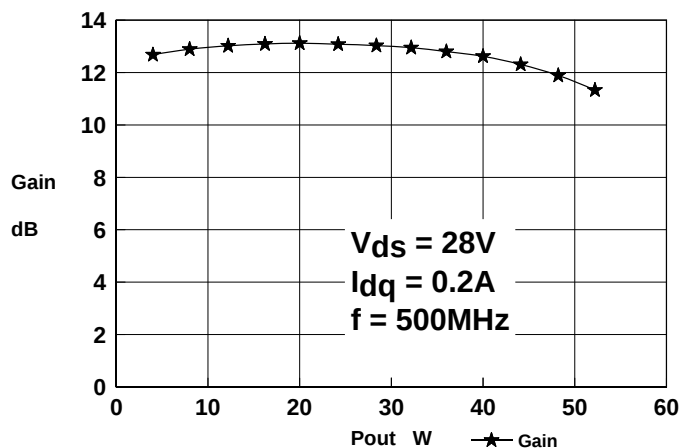


Figure 1- Gain vs. Power Output

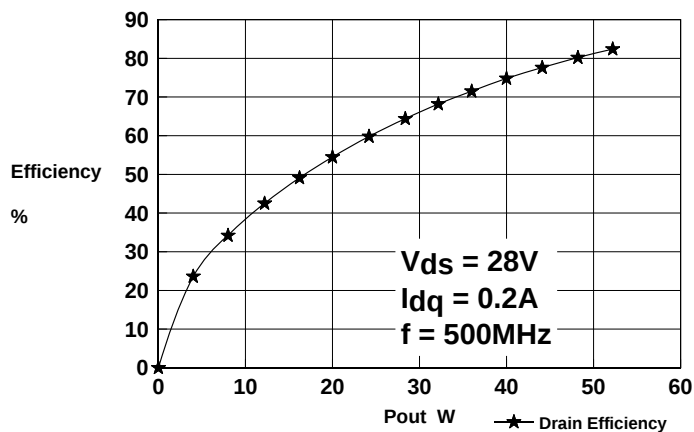


Figure 2 - Efficiency vs Power Output

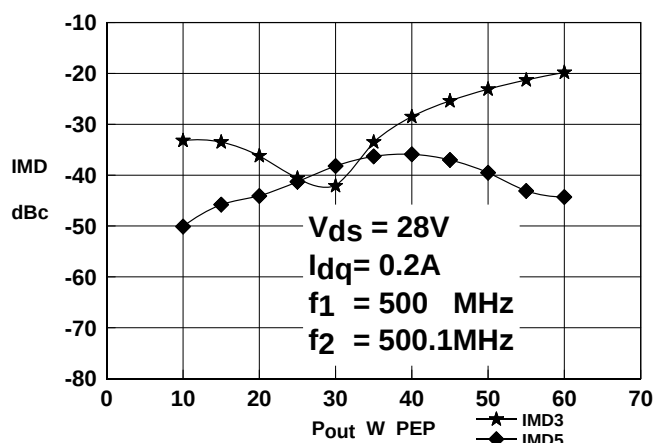


Figure 3 - IMD vs Power Output

## OPTIMUM SOURCE AND LOAD IMPEDANCE

| Frequency<br>MHz | $Z_S$<br>$\Omega$ | $Z_L$<br>$\Omega$ |
|------------------|-------------------|-------------------|
| 500MHz           | $2.3 + j1.0$      | $3.7 + j0.8$      |

## Typical S Parameters

!  $V_{DS} = 28V$ ,  $I_{DQ} = 0.2A$   
# MHz S MA R 50

| Freq<br>MHz | S11  |      | S21   |     | S12   |     | S22  |      |
|-------------|------|------|-------|-----|-------|-----|------|------|
|             | mag  | ang  | mag   | ang | mag   | ang | mag  | ang  |
| 100         | 0.79 | -158 | 14.62 | 69  | 0.012 | -7  | 0.61 | -145 |
| 200         | 0.88 | -167 | 5.82  | 42  | 0.006 | 3   | 0.79 | -156 |
| 300         | 0.92 | -171 | 3.02  | 28  | 0.007 | 60  | 0.87 | -162 |
| 400         | 0.92 | -176 | 1.82  | 18  | 0.117 | 77  | 0.90 | -167 |
| 500         | 0.94 | -179 | 1.44  | 15  | 0.017 | 76  | 0.92 | -169 |
| 600         | 0.95 | 177  | 1.06  | 13  | 0.023 | 75  | 0.95 | -171 |
| 700         | 0.97 | 174  | 0.68  | 10  | 0.029 | 74  | 0.97 | -174 |
| 800         | 0.97 | 171  | 0.54  | 5   | 0.034 | 69  | 0.96 | -177 |
| 900         | 0.98 | 167  | 0.45  | 1   | 0.039 | 64  | 0.97 | 178  |
| 1000        | 0.97 | 165  | 0.36  | 1   | 0.043 | 64  | 0.96 | 178  |

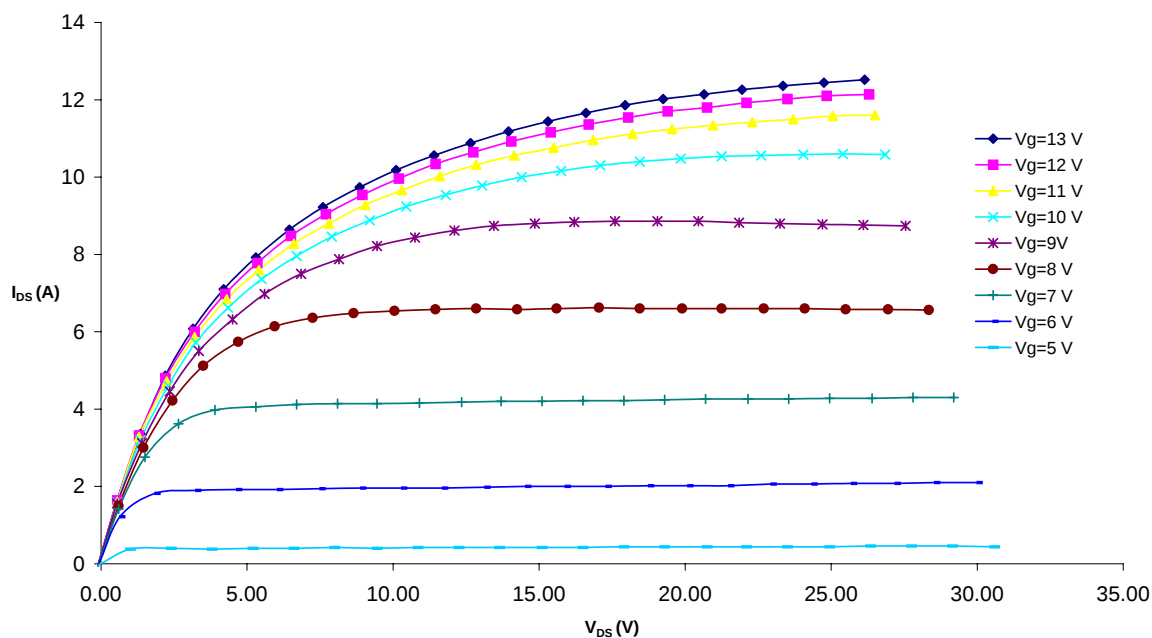


Figure 4 – Typical IV Characteristics.

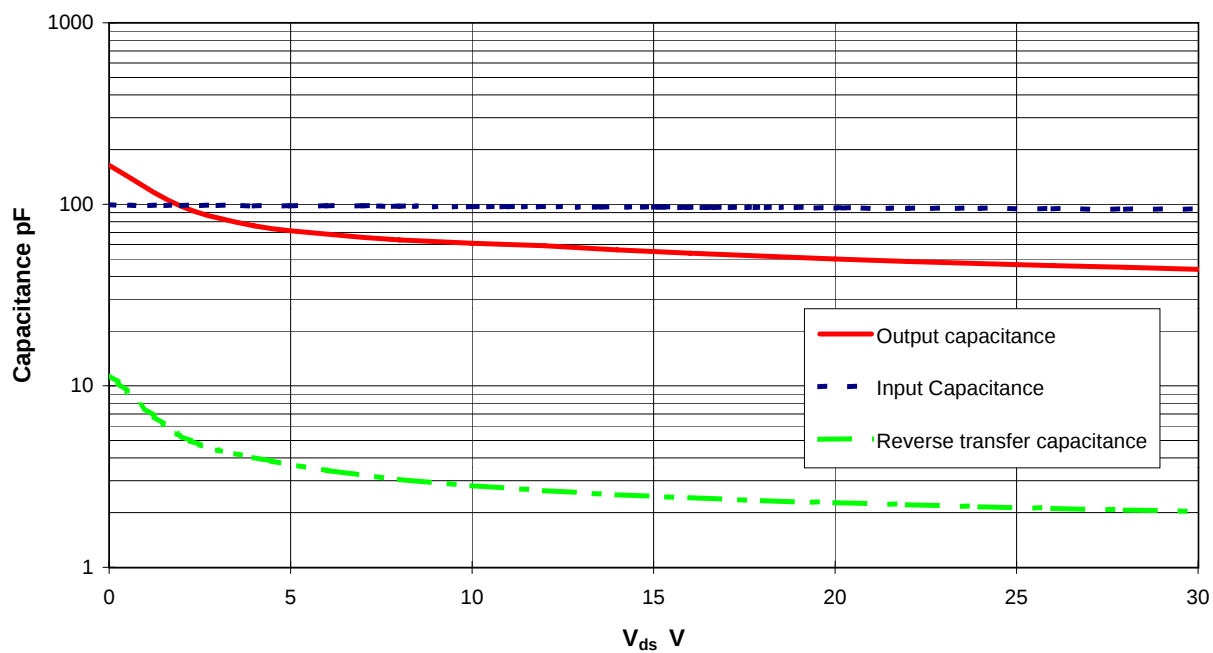
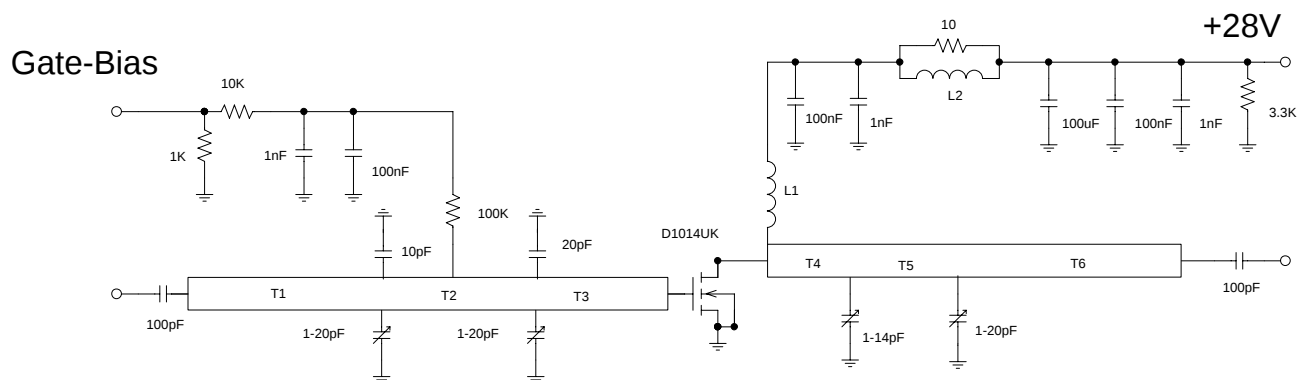


Figure 5 – Typical CV Characteristics.



Substrate 0.8mm G200, Er=4.0

All microstrip lines W=1.68mm

T1 36mm  
T2 16mm  
T3 10mm  
T4 6.5mm  
T5 12mm  
T6 39mm

L1 5.5 turns 20swg enamelled copper wire, 7mm i.d.

L2 1.5 turns 24swg enamelled copper wire on Siemens B62152A7X 2 hole core

## D1014UK 500MHz Test Fixture

# Mouser Electronics

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