



## 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                 | 40   |      |      | V    |
| I <sub>D</sub> DSS<br>Zero Gate Voltage Drain Current | V <sub>DS</sub> = 12.5V      V <sub>GS</sub> = 0               |      |      | 1    | mA   |
| I <sub>G</sub> DSS<br>Gate Leakage Current            | V <sub>GS</sub> = 20V      V <sub>DS</sub> = 0                 |      |      | 1    | 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> = 0.2A               | 0.18 |      |      | S    |
| G <sub>PS</sub><br>Common Source Power Gain           | P <sub>O</sub> = 2.5W  | 10   |      |      | dB   |
| η<br>Drain Efficiency                                 | V <sub>DS</sub> = 12.5V      I <sub>DQ</sub> = 0.1A            | 40   |      |      | %    |
| VSWR<br>Load Mismatch Tolerance                       | f = 1GHz   | 20:1 |      |      | —    |
| C <sub>iss</sub><br>Input Capacitance                 | V <sub>DS</sub> = 0      V <sub>GS</sub> = -5V      f = 1MHz   |      |      | 12   | pF   |
| C <sub>oss</sub><br>Output Capacitance                | V <sub>DS</sub> = 12.5V      V <sub>GS</sub> = 0      f = 1MHz |      |      | 10   | pF   |
| C <sub>rss</sub><br>Reverse Transfer Capacitance      | V <sub>DS</sub> = 12.5V      V <sub>GS</sub> = 0      f = 1MHz |      |      | 1    | 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. 10°C / W |
|-----------------------|------------------------------------|---------------|

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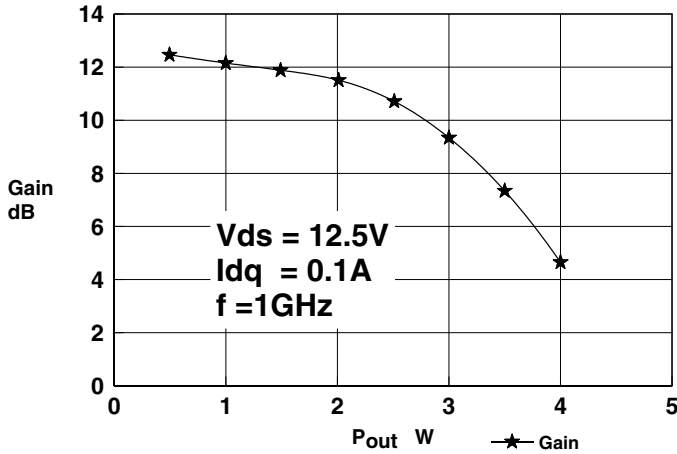


Figure 1- Gain vs. Power Output

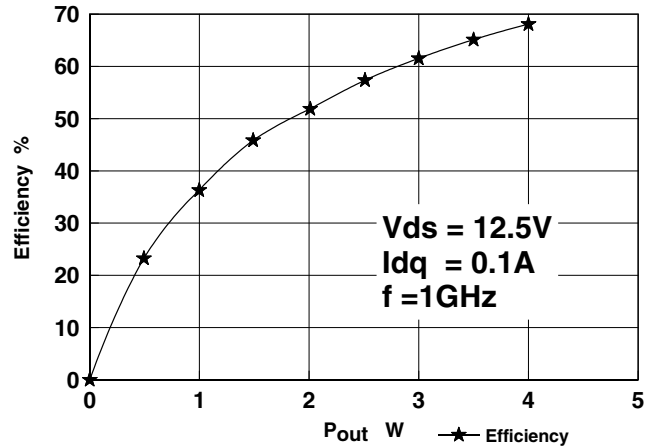


Figure 2 - Efficiency vs Power Output

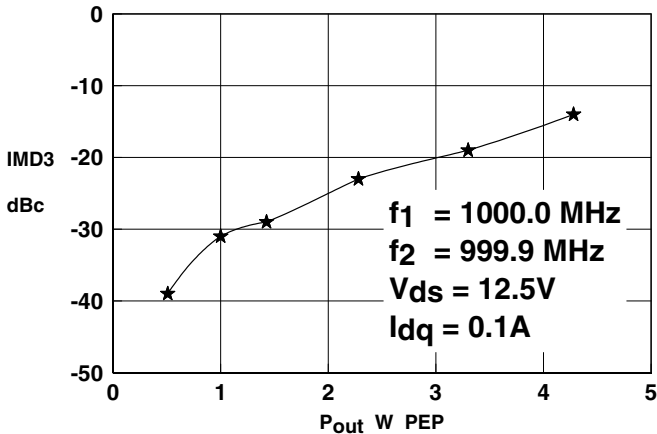


Figure 3 - IMD vs Power Output

OPTIMUM SOURCE AND LOAD IMPEDANCE

| Frequency<br>MHz | Z <sub>S</sub><br>Ω | Z <sub>L</sub><br>Ω |
|------------------|---------------------|---------------------|
| 1000MHz          | 2.8 + j3.0          | 8.0 - j2.0          |

Typical S Parameters

! V<sub>DS</sub> = 12.5V, I<sub>DQ</sub> = 0.2A  
 # MHz S M A R 50

| Freq<br>MHz | S11  |        | S21  |       | S12   |      | S22  |        |
|-------------|------|--------|------|-------|-------|------|------|--------|
|             | mag  | ang    | mag  | ang   | mag   | ang  | mag  | ang    |
| 50          | 0.95 | -38.2  | 16.3 | 160.6 | 0.015 | 67.2 | 0.90 | -34.4  |
| 100         | 0.89 | -55.9  | 14.0 | 139.3 | 0.026 | 49.3 | 0.86 | -55.4  |
| 150         | 0.84 | -75.2  | 11.8 | 122.1 | 0.032 | 33.6 | 0.80 | -74.8  |
| 200         | 0.80 | -90.6  | 9.5  | 107.5 | 0.034 | 23.1 | 0.77 | -89.6  |
| 250         | 0.78 | -99.5  | 8.2  | 97.1  | 0.035 | 13.1 | 0.76 | -97.9  |
| 300         | 0.76 | -109.8 | 6.9  | 92.1  | 0.035 | 11.0 | 0.75 | -106.7 |
| 350         | 0.76 | -115.0 | 6.2  | 80.9  | 0.035 | 2.4  | 0.76 | -113.0 |
| 400         | 0.76 | -121.6 | 5.2  | 74.0  | 0.031 | -2.8 | 0.76 | -119.5 |
| 450         | 0.76 | -126.4 | 4.7  | 74.9  | 0.030 | 0.1  | 0.77 | -123.3 |
| 500         | 0.76 | -131.1 | 4.1  | 67.7  | 0.028 | -4.6 | 0.78 | -127.5 |
| 550         | 0.77 | -135.4 | 3.8  | 65.3  | 0.026 | -3.1 | 0.79 | -131.5 |
| 600         | 0.77 | -139.6 | 3.6  | 60.1  | 0.024 | -4.1 | 0.79 | -135.0 |
| 650         | 0.77 | -142.8 | 3.2  | 53.9  | 0.021 | -4.9 | 0.80 | -137.9 |
| 700         | 0.74 | -148.1 | 2.6  | 52.5  | 0.017 | 0.4  | 0.75 | -140.6 |
| 750         | 0.76 | -148.4 | 3.0  | 52.2  | 0.018 | 8.5  | 0.81 | -141.2 |
| 800         | 0.77 | -153.1 | 2.8  | 46.2  | 0.017 | 14.5 | 0.81 | -144.1 |
| 850         | 0.77 | -155.8 | 2.6  | 40.0  | 0.016 | 22.0 | 0.82 | -146.2 |
| 900         | 0.77 | -159.4 | 2.4  | 35.4  | 0.016 | 31.0 | 0.82 | -148.5 |
| 950         | 0.77 | -163.8 | 2.3  | 32.3  | 0.017 | 40.7 | 0.83 | -150.7 |
| 1000        | 0.76 | -167.7 | 2.2  | 29.7  | 0.017 | 51.3 | 0.82 | -153.1 |
| 1050        | 0.76 | -170.9 | 2.2  | 24.6  | 0.020 | 58.8 | 0.83 | -155.6 |

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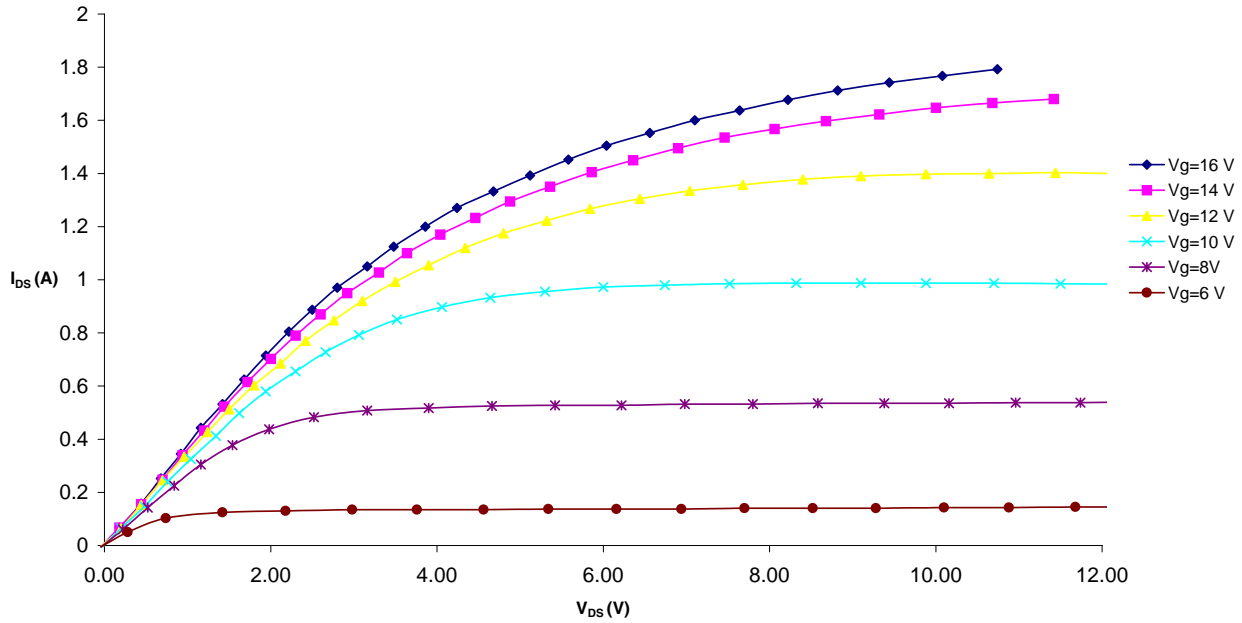


Figure 4 – Typical IV Characteristics.

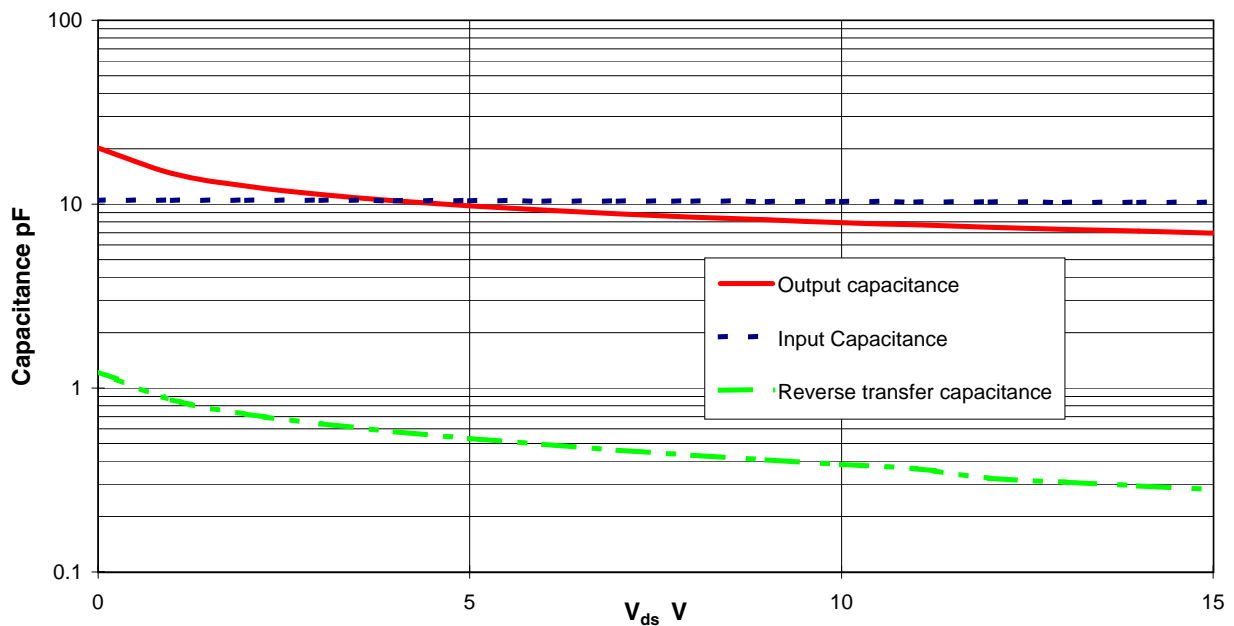
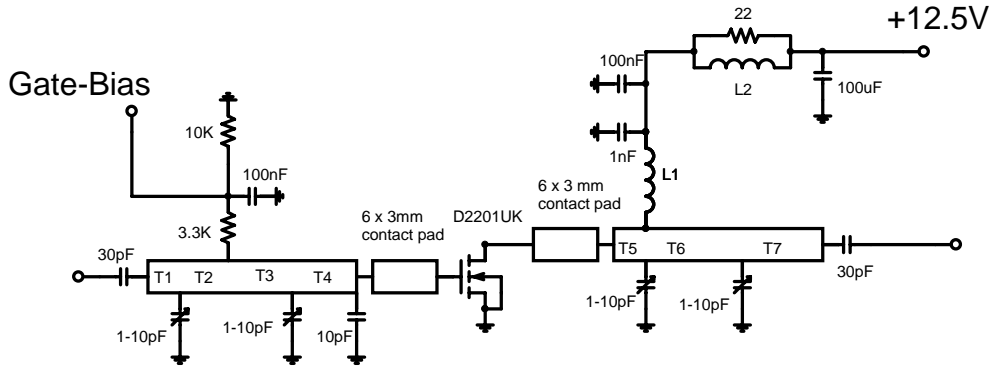


Figure 5 – Typical CV Characteristics.

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Substrate 0.8mm PTFE/glass,  $\epsilon_r=2.5$   
 All microstrip lines  $W=2.2\text{mm}$

T1 3mm

T2 28mm

T3 12mm

T4 9mm

T5 5mm

T6 23 mm

T7 17mm

L1 7.5 turns 24swg enamelled copper wire, 3mm i.d.

L2 1.5 turns 24swg enamelled copper wire on ferrite core

## D2201UK 1000MHz Test Fixture

# Mouser Electronics

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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)