RF Power MOSFET Transistor
15W, 100-500 MHz, 28V

Features
- N-Channel enhancement mode device
- DMOS structure
- Lower capacitances for broadband operation
- Common source configuration
- Lower noise floor
- RoHS Compliant
- 100 MHz to 500 MHz operation

ABSOLUTE MAXIMUM RATINGS AT 25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Voltage</td>
<td>V_{DS}</td>
<td>65</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>V_{GS}</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Drain-Source Current</td>
<td>I_{DS}</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>P_{D}</td>
<td>48.6</td>
<td>W</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>T_{J}</td>
<td>200</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>T_{STG}</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>θ_{JC}</td>
<td>3.6</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

TYPICAL DEVICE IMPEDANCES

\[
\begin{array}{c|c|c}
F (MHz) & Z_{IN} (Ω) & Z_{LOAD} (Ω) \\
100 & 6.4-j25.0 & 22.0+j16.0 \\
300 & 6.5-j12.0 & 15.0+j14.0 \\
500 & 1.7-j10.5 & 8.0+j10.5 \\
\end{array}
\]

\[V_{DD}=28V, I_{DQ}=150 mA, P_{OUT}=15.0 W\]

\[Z_{IN}\] is the series equivalent input impedance of the device from gate to source.

\[Z_{LOAD}\] is the optimum series equivalent load impedance as measured from drain to ground.

ELECTRICAL CHARACTERISTICS AT 25°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Min</th>
<th>Max</th>
<th>Units</th>
<th>Test Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Breakdown Voltage</td>
<td>BV_{DSS}</td>
<td>65</td>
<td>-</td>
<td>V</td>
<td>V_GS = 0.0 V , I_{DS} = 6.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>I_{DSS}</td>
<td>-</td>
<td>3.0</td>
<td>mA</td>
<td>V_GS = 28.0 V , V_{DS} = 0.0 V</td>
</tr>
<tr>
<td>Gate-Source Leakage Current</td>
<td>I_{GSS}</td>
<td>-</td>
<td>3.0</td>
<td>μA</td>
<td>V_GS = 20.0 V , V_{DS} = 0.0 V</td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>V_{GS(TH)}</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>V_GS = 10.0 V , I_{DS} = 30.0 mA</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>G_M</td>
<td>240</td>
<td>-</td>
<td>S</td>
<td>V_GS = 10.0 V , I_{DS} 300.0 mA , \Delta V_{GS} = 1.0V, 80 μs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>C_{ISS}</td>
<td>-</td>
<td>21</td>
<td>pF</td>
<td>V_{DS} = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>C_{OSS}</td>
<td>-</td>
<td>15</td>
<td>pF</td>
<td>V_{DS} = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Reverse Capacitance</td>
<td>C_{RSS}</td>
<td>-</td>
<td>7.2</td>
<td>pF</td>
<td>V_{DS} = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Power Gain</td>
<td>G_P</td>
<td>10</td>
<td>-</td>
<td>dB</td>
<td>V_{DD} = 28.0 V , I_{DQ} = 150.0 mA, P_{OUT} = 15.0 W F =500 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>r_{D}</td>
<td>50</td>
<td>-</td>
<td>%</td>
<td>V_{DD} = 28.0 V , I_{DQ} = 150.0 mA, P_{OUT} = 15.0 W F =500 MHz</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>VSWR-T</td>
<td>-</td>
<td>20:1</td>
<td>-</td>
<td>V_{DD} = 28.0 V , I_{DQ} = 150.0 mA, P_{OUT} = 15.0 W F =500 MHz</td>
</tr>
</tbody>
</table>

For further information and support please visit:
https://www.macom.com/support
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Typical Broadband Performance Curves

**CAPACITANCES vs VOLTAGE**

\[ F = 1.0\text{MHz} \]

- \( C_{iss} \)
- \( C_{oss} \)
- \( C_{rss} \)

\[ V_{DS}(V) \]

\[ C\text{(pF)} \]

\[ 0 \quad 2 \quad 4 \quad 6 \quad 8 \quad 10 \quad 12 \quad 14 \quad 16 \]

\[ 5 \quad 10 \quad 15 \quad 20 \quad 25 \quad 30 \]

**POWER OUTPUT vs VOLTAGE**

\[ P_{in}=1.0\text{W} \quad I_{DS}=150\text{mA} \quad P_{OUT}=500\text{W} \]

\[ V_{DD}(V) \]

\[ \text{POWER OUTPUT (W)} \]

\[ 0 \quad 5 \quad 10 \quad 15 \quad 20 \quad 25 \quad 30 \]

**GAIN vs FREQUENCY**

\[ V_{DD}=28\text{V} \quad P_{OUT}=15\text{W} \quad I_{DS}=100\text{mA} \]

\[ \text{GAIN (dB)} \]

\[ 0 \quad 10 \quad 20 \quad 30 \]

\[ 100 \quad 200 \quad 300 \quad 400 \quad 500 \]

**EFFICIENCY vs FREQUENCY**

\[ V_{DD}=28\text{V} \quad I_{DS}=150\text{mA} \quad P_{OUT}=15\text{W} \]

\[ \text{EFFICIENCY (W)} \]

\[ 50 \quad 55 \quad 60 \quad 65 \quad 70 \]

\[ 100 \quad 200 \quad 300 \quad 400 \quad 500 \]

**POWER OUTPUT vs POWER INPUT**

\[ V_{DD}=28\text{V} \quad I_{DS}=150\text{mA} \]

\[ \text{POWER OUTPUT (W)} \]

\[ 0 \quad 5 \quad 10 \quad 15 \quad 20 \]

\[ 0.02 \quad 0.05 \quad 0.08 \quad 0.1 \quad 0.25 \quad 0.5 \quad 0.75 \]

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TEST FIXTURE SCHEMATIC

L1/L2
8 TURNS OF NO. 22 AWG ON 0.12"

L3
20 TURNS OF NO. 22 AWG ON 0.12"

BOARD TYPE
TEFLON FIREGLASS .062" THICK 1 OZ. COPPER ON BOTH SIDES

TEST FIXTURE ASSEMBLY
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