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

Features
- N-channel enhancement mode device
- DMOS structure
- Lower capacitances for broadband operation
- High saturated output power
- Lower noise figure than competitive devices
- RoHS Compliant

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>12*</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>P_D</td>
<td>250</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>0.7</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

TYPICAL DEVICE IMPEDANCES

<table>
<thead>
<tr>
<th>F (MHz)</th>
<th>Z_N (Ω)</th>
<th>Z_LOAD (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>4.5-j6.0</td>
<td>14.5+j0.5</td>
</tr>
<tr>
<td>300</td>
<td>2.25-j1.75</td>
<td>7.5+j1.0</td>
</tr>
<tr>
<td>500</td>
<td>1.5+j5.5</td>
<td>3.5+j3.5</td>
</tr>
</tbody>
</table>

Z_IN is the series equivalent input impedance of the device from gate to gate.

Z_LOAD is the optimum series equivalent load impedance as measured from drain.

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>V_DSS</td>
<td>65</td>
<td>-</td>
<td>V</td>
<td>V_GS = 0.0 V, I_DS = 15.0 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_GS = 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_GS = 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_GS = 300.0 mA</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>G_M</td>
<td>1.5</td>
<td>-</td>
<td>S</td>
<td>V_GS = 10.0 V, I_GS = 300.0 mA, ΔV_GS = 1.0V, 80 µs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>C_ISS</td>
<td>-</td>
<td>135</td>
<td>pF</td>
<td>V_GS = 28.0 V, F = 1.0 MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>C_OSS</td>
<td>-</td>
<td>90</td>
<td>pF</td>
<td>V_GS = 28.0 V, F = 1.0 MHz</td>
</tr>
<tr>
<td>Reverse Capacitance</td>
<td>CRSS</td>
<td>-</td>
<td>24</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_DD = 600.0 mA, P_OUT = 100.0 W F =500 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>η_D</td>
<td>50</td>
<td>-</td>
<td>%</td>
<td>V_DD = 28.0 V, I_DD = 600.0 mA, P_OUT = 100.0 W F =500 MHz</td>
</tr>
<tr>
<td>Return Loss</td>
<td>R_L</td>
<td>10</td>
<td>-</td>
<td>dB</td>
<td>V_DD = 28.0 V, I_DD = 600.0 mA, P_OUT = 100.0 W F =500 MHz</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>VSWR-T</td>
<td>-</td>
<td>30:1</td>
<td></td>
<td>V_DD = 28.0 V, I_DD = 600.0 mA, P_OUT = 100.0 W F =500 MHz</td>
</tr>
</tbody>
</table>

*Per side
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Typical Broadband Performance Curves

**EFFICIENCY vs FREQUENCY**

\[ P_{in}=10W \quad I_{DQ}=600 \text{ mA} \text{ (Push pull device)} \]

\[
\begin{array}{c|c|c|c|c|c|c|c|c}
\text{FREQUENCY (MHz)} & 100 & 200 & 300 & 400 & 500 \\
\hline
\text{EFFICIENCY (\%)} & 80 & 70 & 60 & 50 & 40 \\
\end{array}
\]

**POWER OUTPUT vs SUPPLY VOLTAGE**

\[ P_{in}=10W \quad I_{DQ}=600 \text{ mA} \quad F=500 \text{ MHz} \]

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c}
\text{SUPPLY VOLTAGE (V)} & 14 & 16 & 20 & 24 & 28 & 32 \\
\hline
\text{POWER OUTPUT (W)} & 0 & 20 & 40 & 60 & 80 & 100 & 120 \\
\end{array}
\]

**POWER OUTPUT vs POWER INPUT**

\[ V_{DD}=28 \text{ V} \quad I_{DQ}=600 \text{ mA} \text{ (Push pull device)} \]

\[
\begin{array}{c|c|c|c|c|c}
\text{POWER INPUT (W)} & 0 & 1 & 2 & 4 & 6 \\
\hline
\text{POWER OUTPUT (W)} & 0 & 20 & 40 & 80 & 120 \\
\end{array}
\]

For further information and support please visit:
https://www.macom.com/support
UF28100H

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TEST FIXTURE SCHEMATIC

L - L1 TERMINATED INDUCTORS ON PCB
L1 6 TURNS OF NO. 16 AWG ON A 3/8"
T1 20 = 50 OHMS, UT385-W17, 0.087" OD X 3.500" LONG
T2 20 = 10 OHMS, UT385-W17, 0.087" OD X 2.000" LONG
T3 20 = 10 OHMS, UT385-W17, 0.087" OD X 2.000" LONG
T4 20 = 50 OHMS, UT385-W17, 0.087" OD X 4.000" LONG

REV. V1

Visit www.macom.com for additional data sheets and product information.

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