RF Power MOSFET Transistor
120 W, 2 - 175 MHz, 28 V

Features
- N-Channel enhancement mode device
- DMOS structure
- Lower capacitances for broadband operation
- High saturated output power
- Lower noise figure than bipolar 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>24</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>P_D</td>
<td>269</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>0.65</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

PACKAGE OUTLINE

TYPICAL DEVICE IMPEDANCE

\[
\begin{array}{|c|c|c|}
\hline
F (MHz) & Z_{\text{in}} (\Omega) & Z_{\text{load}} (\Omega) \\
\hline
30 & 4.0 - j8.0 & 3.4 + j2.4 \\
50 & 1.0 - j2.5 & 2.2 + j1.3 \\
100 & 1.0 - j0.5 & 2.2 + j0.0 \\
\hline
\end{array}
\]

Z_{\text{in}} is the series equivalent input impedance of the device from gate to source.

Z_{\text{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} = 3.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>I_{DS}</td>
<td>-</td>
<td>6.0</td>
<td>mA</td>
<td>V_{DS} = 28.0 V , V_{GS} = 0.0 V</td>
</tr>
<tr>
<td>Gate-Source Leakage Current</td>
<td>I_{GS}</td>
<td>-</td>
<td>6.0</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_{GTH}</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>V_{DS} = 10.0 V , I_{DS} = 600.0 mA</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>G_{m}</td>
<td>3.0</td>
<td>-</td>
<td>S</td>
<td>V_{DS} = 10.0 V , I_{DS} = 6000.0 mA , Δ V_{GS} = 1.0V, 80 µs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>C_{GS}</td>
<td>-</td>
<td>270</td>
<td>pF</td>
<td>V_{DS} = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>C_{DS}</td>
<td>-</td>
<td>240</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>48</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>13</td>
<td>-</td>
<td>dB</td>
<td>V_{DS} = 28.0 V , I_{DS} = 600 mA, P_{OUT} = 120.0 W F =175 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>η_d</td>
<td>60</td>
<td>-</td>
<td>%</td>
<td>V_{DS} = 28.0 V , I_{DS} = 600 mA, P_{OUT} = 120.0 W F =175 MHz</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>V_{SWR-T}</td>
<td>-</td>
<td>30:1</td>
<td>-</td>
<td>V_{DS} = 28.0 V , I_{DS} = 600 mA, P_{OUT} = 120.0 W F =175 MHz</td>
</tr>
</tbody>
</table>

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Typical Broadband Performance Curves

GAIN vs FREQUENCY
V_{DD}=28 V  I_{DQ}=600 mA  P_{OUT}=120 W

EFFICIENCY vs FREQUENCY
V_{DD}=28 V  I_{DQ}=600 mA  P_{OUT}=120 W

POWER OUTPUT vs POWER INPUT
V_{DD}=28 V  I_{DQ}=50 mA

POWER OUTPUT vs SUPPLY VOLTAGE
F=175 MHz  I_{DQ}=600 mA  P_{IN}=3.0 W

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TEST FIXTURE SCHEMATIC

VGS J3
VDS J4

VDS = 28 VOLTS
IDQ = 600mA

C1, C6
TRIMMER CAPACITOR 5-80pF
C2, C5
CAPACITOR 50pF
C3
TRIMMER CAPACITOR 4-40pF
C4, C11
MONOLITHIC CIRCUIT CAPACITOR 0.01uF
C7
TRIMMER CAPACITOR 9-180pF
C8, C9
CAPACITOR 300pF
C10
CAPACITOR 1000pF
C12
ELECTROLYTIC CAPACITOR 50uF 50 VOLT
L1, L2
NO. 12 AWG COPPER WIRE X 0.87" (LOOP 0.4")
L3, L4
8 TURNS OF NO. 16 AWG ENAMEL WIRE ON
Ø0.25", CLOSE WOUND
R1, R2
RESISTOR 2.7k OHMS 0.25 WATT
Q1
DU28120T
BOARD
FR4 0.062"
RF Power MOSFET Transistor
120 W, 2 - 175 MHz, 28 V

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