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>

TYPICAL DEVICE IMPEDANCE

<table>
<thead>
<tr>
<th>F (MHz)</th>
<th>Z_in (Ω)</th>
<th>Z_LOAD (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>4.0 - j8.0</td>
<td>3.4 + j2.4</td>
</tr>
<tr>
<td>50</td>
<td>1.0 - j2.5</td>
<td>2.2 + j1.3</td>
</tr>
<tr>
<td>100</td>
<td>1.0 - j0.5</td>
<td>2.2 + j0.0</td>
</tr>
</tbody>
</table>

V_DD = 28V, I_DQ = 600mA, P_OUT = 120 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 = 3.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>I_DSS</td>
<td>-</td>
<td>6.0</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>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_GS(TH)</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>V_GS = 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_GS = 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_GS = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>C_DSS</td>
<td>-</td>
<td>240</td>
<td>pF</td>
<td>V_GS = 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_GS = 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_GS = 28.0 V , I_QO = 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_GS = 28.0 V , I_QO = 600 mA, P_OUT = 120.0 W F =175 MHz</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>VSWR-T</td>
<td>-</td>
<td>30:1</td>
<td>-</td>
<td>V_GS = 28.0 V , I_QO = 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 SCHEMAT

VGS J3
VDS J4
R2
C10
C12
C11
C9
L4
L3
C7
C6
RF OUT J2

VDS = 28 VOLTS
IDQ = 600 mA

RF IN J1
C1
L1
C2
C3

C4
R1
L2
Q1
C5
C8
C11

C10
C9

C12

PARTS LIST
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 9-100pF
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"