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>

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_{DS} = 0.0 V, I_{DS} = 3.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>I_{GS}</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_{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_{GS(TH)}</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_{CO} = 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_{CO} = 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>30:1</td>
<td>-</td>
<td></td>
<td>V_{CO} = 28.0 V, I_{QO} = 600 mA, P_{OUT} = 120.0 W F =175 MHz</td>
</tr>
</tbody>
</table>
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120 W, 2 - 175 MHz, 28 V

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
TEST FIXTURE SCHEMATIC

VGS J3
VDS J4
VDS = 28 VOLTS
IDQ = 600mA
R2
C10
C11
C12
C9
L4
C7
L3
C5
C6
RF IN J1
C1
C3
L1
L2
G1
Q1
RF OUT J2
C2
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” (LDDP 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
G1 DU28120T
BOARD FR4 0.062”
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120 W, 2 - 175 MHz, 28 V

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