RF Power MOSFET Transistor
80 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>VDS</td>
<td>65</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>VGS</td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Drain-Source Current</td>
<td>IDSS</td>
<td>16</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>PD</td>
<td>206</td>
<td>W</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>TJ</td>
<td>-200</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>TSTG</td>
<td>-65 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>θJ</td>
<td>0.85</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

TYPICAL DEVICE IMPEDANCE

<table>
<thead>
<tr>
<th>F (MHz)</th>
<th>ZIN (Ω)</th>
<th>ZLOAD (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>5.4 - j4.4</td>
<td>5.7 + j4.7</td>
</tr>
<tr>
<td>50</td>
<td>2.5 - j4.4</td>
<td>3.4 + j3.5</td>
</tr>
<tr>
<td>100</td>
<td>1.6 - j3.4</td>
<td>2.4 + j2.4</td>
</tr>
<tr>
<td>175</td>
<td>0.7 - j1.2</td>
<td>1.7 + j0.8</td>
</tr>
</tbody>
</table>

ZIN is the series equivalent input impedance of the device from gate to source.
ZLOAD 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>BVDS</td>
<td>65</td>
<td>-</td>
<td>V</td>
<td>VDS = 0.0 V , IDSS = 20.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>IDSS</td>
<td>-</td>
<td>4.0</td>
<td>mA</td>
<td>VDS = 28.0 V , VDS = 0.0 V</td>
</tr>
<tr>
<td>Gate-Source Leakage Current</td>
<td>IDSS</td>
<td>-</td>
<td>4.0</td>
<td>μA</td>
<td>VDS = 20.0 V , VDS = 0.0 V</td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>VGS(TIH)</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>VDS = 10.0 V , IDSS = 400.0 mA</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>Gm</td>
<td>2.0</td>
<td>-</td>
<td>S</td>
<td>VDS = 10.0 V , IDSS = 4.0 A , ΔVGS = 1.0V , 80 μs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>Ciss</td>
<td>-</td>
<td>180</td>
<td>pF</td>
<td>VDS = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>COSS</td>
<td>-</td>
<td>160</td>
<td>pF</td>
<td>VDS = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Reverse Capacitance</td>
<td>Crss</td>
<td>-</td>
<td>32</td>
<td>pF</td>
<td>VDS = 28.0 V , F = 1.0 MHz</td>
</tr>
<tr>
<td>Power Gain</td>
<td>GP</td>
<td>13</td>
<td>-</td>
<td>dB</td>
<td>VDD = 28.0 V , IDSS = 400 mA , POUT = 60.0 W F = 175 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>rD</td>
<td>60</td>
<td>-</td>
<td>%</td>
<td>VDD = 28.0 V , IDSS = 400 mA , POUT = 60.0 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>VDD = 28.0 V , IDSS = 400 mA , POUT = 60.0 W F = 175 MHz</td>
</tr>
</tbody>
</table>
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80 W, 2 - 175 MHz, 28 V

Typical Broadband Performance Curves

GAIN vs FREQUENCY
\( V_{DD}=28 \, V \), \( I_{DQ}=400 \, mA \), \( P_{OUT}=80 \, W \)

EFFICIENCY vs FREQUENCY
\( V_{DD}=28 \, V \), \( I_{DQ}=400 \, mA \), \( P_{OUT}=80 \, W \)

POWER OUTPUT vs POWER INPUT
\( V_{DD}=28 \, V \), \( I_{DQ}=400 \, mA \)

POWER OUTPUT vs SUPPLY VOLTAGE
\( I_{DQ}=400 \, mA \), \( F=175 \, MHz \), \( P_{IN}=3.0 \, W \)
TEST FIXTURE SCHEMATIC

VGS, J3

VDS, J4

C12

R2

C11

L4

C10

L3

C9

C7

C8

R1

Q1

L2

C6

Q2

RF IN

J1

C4

RF OUT

J2

C5

C3

C1

C2

C12 = 28 VOLTS

IDQ = 400mA

PARTS LIST

C1, C3 TRIMMER CAPACITOR 4-40pF
C2, C9, C10 CAPACITOR 50pF
C4, C11 CAPACITOR 1000pF
C5 MONOLITHIC CIRCUIT CAPACITOR 0.01µF
C6, C8 TRIMMER CAPACITOR 9-180pF
C7 CAPACITOR 15pF
C12 ELECTROLYTIC CAPACITOR 50µF 50 VOLT
L1 NO. 12 AWG COPPER WIRE X 1.18" (LOOP 0.5")
L2 NO. 12 AWG COPPER WIRE X 1" (LOOP 0.4")
L3, L4 8 TURNS OF NO. 18 AWG ENAMEL WIRE ON
Ø0.25", CLOSE WOUND
R1 RESISTOR 300 OHMS 0.5 WATT
R2 RESISTOR 2.7K OHMS 0.25 WATT
Q1 DU2880T
BOARD FR4 0.062"
RF Power MOSFET Transistor
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