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>$V_{DS}$</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>16</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>$P_D$</td>
<td>206</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>-65 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>$\theta_{JC}$</td>
<td>0.85</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>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>

$V_{DD} = 28 V$, $I_{DS} = 400 mA$, $P_{OUT} = 80 W$

$Z_{IN}$ 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>$B V_{DBS}$</td>
<td>65</td>
<td>-</td>
<td>V</td>
<td>$V_{DS} = 0.0 V$, $I_{DS} = 20.0 mA$</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>$I_{DSS}$</td>
<td>-</td>
<td>4.0</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>$I_{GSS}$</td>
<td>-</td>
<td>4.0</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>$V_{GS} = 10.0 V$, $I_{DS} = 400.0 mA$</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>$G_m$</td>
<td>2.0</td>
<td>-</td>
<td>s</td>
<td>$V_{DS} = 10.0 V$, $I_{DS} = 4.0 A$, $\Delta V_{GS} = 1.0 V$, 80 µs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>$C_{ISS}$</td>
<td>-</td>
<td>180</td>
<td>pF</td>
<td>$V_{DS} = 28.0 V$, $F = 1.0 MHz$</td>
</tr>
<tr>
<td>Output Capacitance</td>
<td>$C_{OSS}$</td>
<td>-</td>
<td>160</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>32</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>$V_{DD} = 28.0 V$, $I_{DS} = 400 mA$, $P_{OUT} = 60.0 W$ F =175 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>$\eta_D$</td>
<td>60</td>
<td>-</td>
<td>%</td>
<td>$V_{DD} = 28.0 V$, $I_{DS} = 400 mA$, $P_{OUT} = 60.0 W$ F =175 MHz</td>
</tr>
<tr>
<td>Load Mismatch Tolerance</td>
<td>VSWR-T</td>
<td>-</td>
<td>30:1</td>
<td></td>
<td>$V_{DD} = 28.0 V$, $I_{DS} = 400 mA$, $P_{OUT} = 60.0 W$ F =175 MHz</td>
</tr>
</tbody>
</table>
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Typical Broadband Performance Curves

GAIN vs FREQUENCY

V_{DD}=28 V \ I_{DQ}=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=175MHz \ P_{IN}=3.0 W

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TEST FIXTURE SCHEMATIC

VGS, J3
VDS, J4
C12
C11
C10
L4
L3
C8
C7
C6
RF IN,
J1
C1
L1
Q1
L2
RF OUT,
J2
C3
C2
C4
C5
R1

VDS = 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 0.01uF
C6, C8  TRIMMER CAPACITOR 9-180pF
C7  CAPACITOR 15pF
C12  ELECTROLYTIC CAPACITOR 50uF 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"
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