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>θ_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>

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>V_DS</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_DS</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_GS</td>
<td>-</td>
<td>4.0</td>
<td>μA</td>
<td>V_DS = 20.0 V, V_GS = 0.0 V</td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>V_DS(TH)</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>V_DS = 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, Δ V_DS = 1.0V, 80 μs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>C_IS</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_DD = 400 mA, P_OUT = 60.0 W F =175 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>η_D</td>
<td>60</td>
<td>-</td>
<td>%</td>
<td>V_DD = 28.0 V, I_DD = 400 mA, P_OUT = 60.0 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_DD = 28.0 V, I_DD = 400 mA, P_OUT = 60.0 W F =175 MHz</td>
</tr>
</tbody>
</table>
DU2880T

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Typical Broadband Performance Curves

**GAIN vs FREQUENCY**

\[ V_{DD}=28 \, V \, I_{DQ}=400 \, mA \, P_{OUT}=80 \, W \]

\[ \text{FREQUENCY (MHz)} \]

\[ \text{GAIN (dB)} \]

\[ 25 \quad 50 \quad 100 \quad 150 \quad 175 \]

\[ 50 \quad 60 \quad 70 \quad 80 \]

**EFFICIENCY vs FREQUENCY**

\[ V_{DD}=28 \, V \, I_{DQ}=400 \, mA \, P_{OUT}=80 \, W \]

\[ \text{FREQUENCY (MHz)} \]

\[ \text{EFFICIENCY (%)} \]

\[ 25 \quad 20 \quad 15 \quad 10 \]

**POWER OUTPUT vs POWER INPUT**

\[ V_{DD}=28 \, V \, I_{DQ}=400 \, mA \]

\[ \text{POWER INPUT (W)} \]

\[ 0.1 \quad 0.2 \quad 0.3 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \]

\[ 0 \quad 20 \quad 40 \quad 60 \quad 80 \quad 100 \quad 120 \]

**POWER OUTPUT vs SUPPLY VOLTAGE**

\[ I_{DQ}=400 \, mA \, F=175MHz \, P_{IN}=3.0 \, W \]

\[ \text{SUPPLY VOLTAGE (W)} \]

\[ 13 \quad 15 \quad 20 \quad 25 \quad 30 \quad 33 \]

\[ 0 \quad 20 \quad 40 \quad 60 \quad 80 \quad 100 \quad 120 \]
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TEST FIXTURE SCHEMATIC

VGS = 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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