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 competitive 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>8*</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>-55 to +150</td>
<td>°C</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>θJC</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>4.5 - j14.5</td>
<td>13.5 + j4.5</td>
</tr>
<tr>
<td>100</td>
<td>3.0 - j10.5</td>
<td>13.5 + j6.0</td>
</tr>
<tr>
<td>175</td>
<td>2.0 - j7.5</td>
<td>12.0 + j4.5</td>
</tr>
</tbody>
</table>

VDD = 28V, IDQ = 400mA, POUT = 80 W

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, IDS = 10.0 mA</td>
</tr>
<tr>
<td>Drain-Source Leakage Current</td>
<td>IDSS</td>
<td>-</td>
<td>2.0</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>2.0</td>
<td>μA</td>
<td>VDS = 28.0 V, VDS = 0.0 V</td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>VGS(TH)</td>
<td>2.0</td>
<td>6.0</td>
<td>V</td>
<td>VDS = 10.0 V, IDS = 200.00 mA</td>
</tr>
<tr>
<td>Forward Transconductance</td>
<td>Gm</td>
<td>1.0</td>
<td>-</td>
<td>S</td>
<td>VDS = 10.0 V, IDS = 2000.00 mA, ΔVGS = 1.0V, 80 μs Pulse</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>Ciss</td>
<td>-</td>
<td>90</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>80</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>16</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, IDQ = 400 mA, POUT = 80.0 W F = 175 MHz</td>
</tr>
<tr>
<td>Drain Efficiency</td>
<td>ηD</td>
<td>60</td>
<td>-</td>
<td>%</td>
<td>VDD = 28.0 V, IDQ = 400 mA, POUT = 80.0 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, IDQ = 400 mA, POUT = 80.0 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**
  \[ V_{DD}=28 \text{ V} \quad I_{DO}=400 \text{ mA} \quad P_{OUT}=80 \text{ W} \]
  
  - Frequency (MHz)
  - GAIN (dB)

- **EFFICIENCY vs FREQUENCY**
  \[ V_{DD}=28 \text{ V} \quad I_{DO}=400 \text{ mA} \quad P_{OUT}=80 \text{ W} \]
  
  - Frequency (MHz)
  - EFFICIENCY (%)

- **POWER OUTPUT vs POWER INPUT**
  \[ V_{DD}=28 \text{ V} \quad I_{DO}=400 \text{ mA} \]
  
  - POWER OUTPUT (W)
  - POWER INPUT (W)

- **POWER OUTPUT vs SUPPLY VOLTAGE**
  \[ F=175\text{MHz} \quad I_{DO}=400 \text{ mA} \quad P_{IN}=1.5 \text{ W} \]
  
  - SUPPLY VOLTAGE (V)
  - POWER OUTPUT (W)
DU2880V

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Rev. V1

TEST FIXTURE ASSEMBLY

PARTS LIST

C1  TRIMMER CAPACITOR 1pF-20pF
C2,C3,C4, CAPACITOR 0.001pF
C6,C9,C10  CAPACITOR 0.001pF
C11  TRIMMER CAPACITOR 0-20pF
C6  CAPACITOR 68pF
C7  CAPACITOR 33pF
C12  ELECTROLYTIC CAPACITOR 100µF 50 VOLTS
L1,L2  0.50" X 0.50" TRACE ON BOARD + #0.035" X #0.035" LOOP
L3,L4  0.07" X 0.10" TRACE ON BOARD
L5  7.5 TURNS OF NO. 20 AWG COPPER WIRE X #0.031"
R1  RESISTOR 10 OHMS 2 WATTS
R2  RESISTOR 10K OHMS
T1,T4  20 OHM BALUN CORES, 2 TURNS OF 50 OHM COAX THRU
      2 STACKPOLE 57-1522
T2,T3,T4  4X TRANSFORMER 1 TURN OF 50 OHM COAX IN
      T5  PARALLEL THRU 2 STACKPOLE 57-1522 BALUN CORES
G1  DU8880V
BOARD  FR4 0.062"
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80 W, 2 - 175 MHz, 28 V

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