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>IDS</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>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>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 , IDS = 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 , VGS = 0.0 V</td>
</tr>
<tr>
<td>Gate-Source Leakage Current</td>
<td>IGSS</td>
<td>-</td>
<td>4.0</td>
<td>μA</td>
<td>VGS = 20.0 V , VDS = 0.0 V</td>
</tr>
<tr>
<td>Gate Threshold Voltage</td>
<td>VGS(TH)</td>
<td>-</td>
<td>2.0</td>
<td>V</td>
<td>VDS = 10.0 V , IDS = 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 , IDS = 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 , IDQ = 400 mA, POUT = 60.0 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 = 60.0 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>VDD = 28.0 V , IDQ = 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
$V_{DD}=28 \text{ V}$, $I_{DQ}=400 \text{ mA}$, $P_{OUT}=80 \text{ W}$

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

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

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

VGS J3

VDS J4

R2

C12

C11

L4

C10

L3

C7

C9

C6

RF IN J1

C1

L1

Q1

L2

C8

RF OUT J2

C3

C2

C4

C5

R1

Q1 DU2880T

BOARD FR4 0.062"

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

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