



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

MITSUBISHI RF POWER MOS FET

RD70HHF1

Silicon MOSFET Power Transistor 30MHz,70W

DESCRIPTION

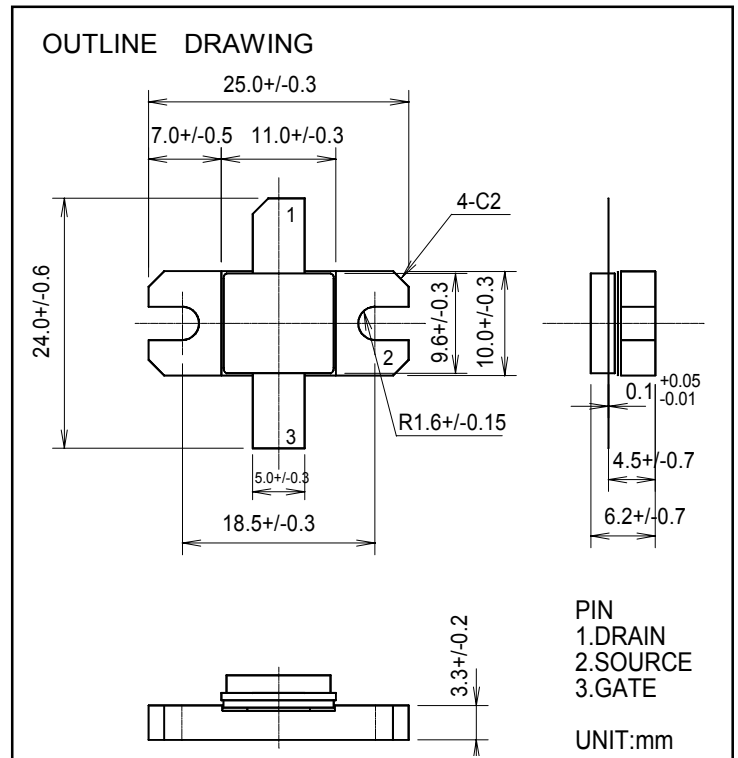
RD70HHF1 is a MOS FET type transistor specifically designed for HF High power amplifiers applications.

FEATURES

- High power and High Gain:
Pout>70W, Gp>13dB @Vdd=12.5V,f=30MHz
- High Efficiency: 60%typ.on HF Band

APPLICATION

For output stage of high power amplifiers in HF Band mobile radio sets.



ABSOLUTE MAXIMUM RATINGS

(Tc=25°C UNLESS OTHERWISE NOTED)

| SYMBOL | PARAMETER | CONDITIONS | RATINGS | UNIT |
|---------------------|-------------------------|-------------------------------------|-------------|------|
| V _{DSS} | Drain to source voltage | V _{GS} =0V | 50 | V |
| V _{GSS} | Gate to source voltage | V _{DS} =0V | +/-20 | V |
| P _{ch} | Channel dissipation | T _c =25°C | 150 | W |
| P _{in} | Input power | Z _g =Z _l =50Ω | 5 | W |
| I _D | Drain current | - | 20 | A |
| T _{ch} | Channel Temperature | - | 175 | °C |
| T _{stg} | Storage temperature | - | -40 to +175 | °C |
| R _{th j-c} | Thermal resistance | junction to case | 1.0 | °C/W |

Note 1: Above parameters are guaranteed independently.

ELECTRICAL CHARACTERISTICS (Tc=25deg.C , UNLESS OTHERWISE NOTED)

| SYMBOL | PARAMETER | CONDITIONS | LIMITS | | | UNIT |
|------------------|---------------------------------|--|------------|-----|------|------|
| | | | MIN | TYP | MAX. | |
| I _{DSS} | Zero gate voltage drain current | V _{DS} =17V, V _{GS} =0V | - | - | 10 | μA |
| I _{GSS} | Gate to source leak current | V _{GS} =10V, V _{DS} =0V | - | - | 1 | μA |
| V _{TH} | Gate threshold voltage | V _{DS} =12V, I _{DS} =1mA | 1.5 | - | 4.5 | V |
| P _{out} | Output power | f=30MHz, V _{DD} =12.5V | 70 | 80 | - | W |
| η _D | Drain efficiency | P _{in} =3.5W, I _{dq} =1.0A | 55 | 60 | - | % |
| | Load VSWR tolerance | V _{DD} =15.2V, P _o =70W (Pin Control) f=30MHz, I _{dq} =1.0A, Z _g =50Ω Load VSWR=20:1 (All Phase) | No destroy | | | - |

Note : Above parameters , ratings , limits and conditions are subject to change.



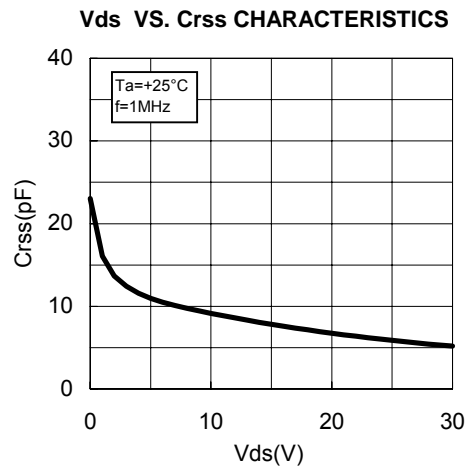
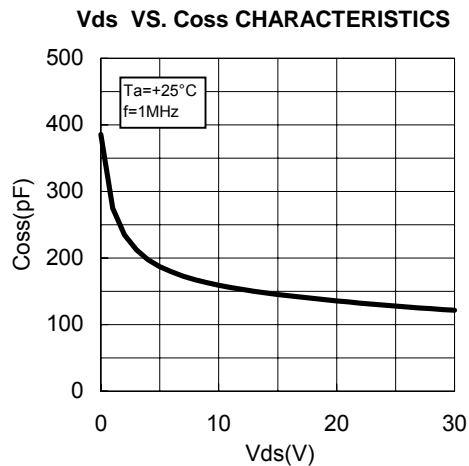
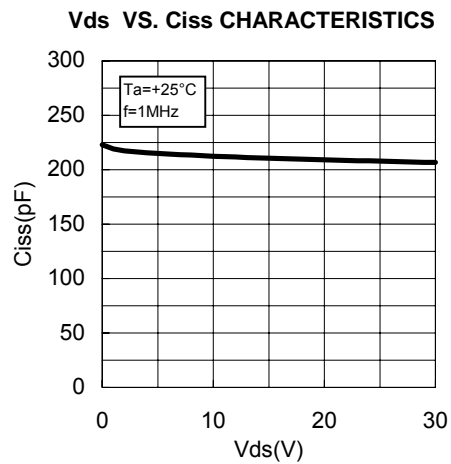
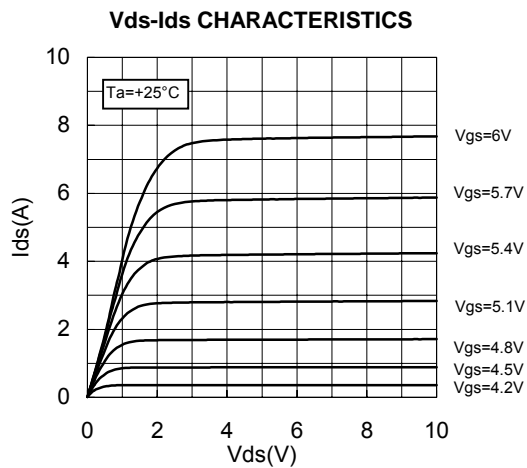
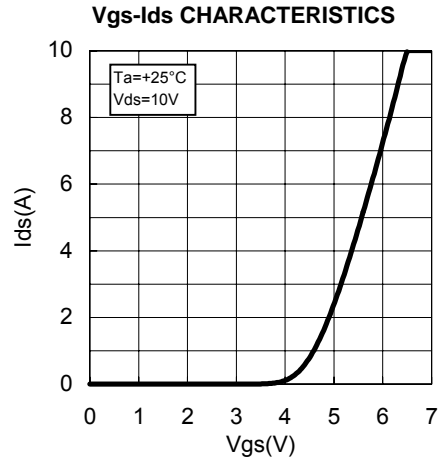
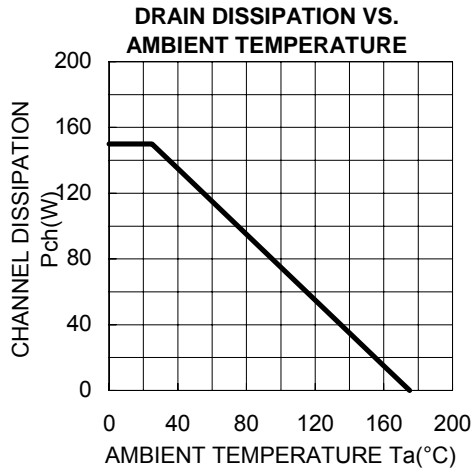
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TYPICAL CHARACTERISTICS





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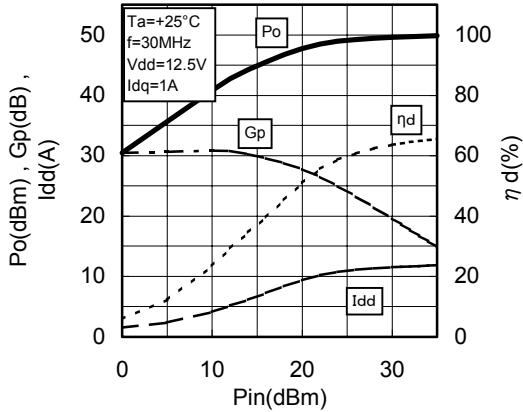
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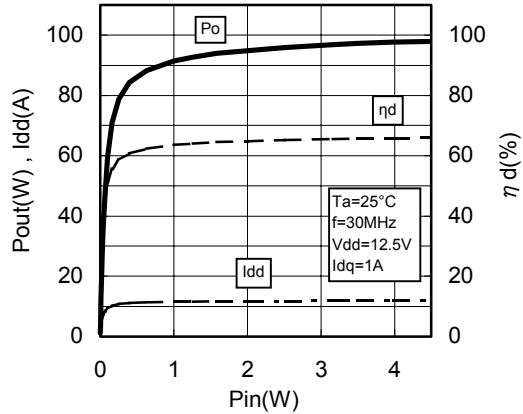
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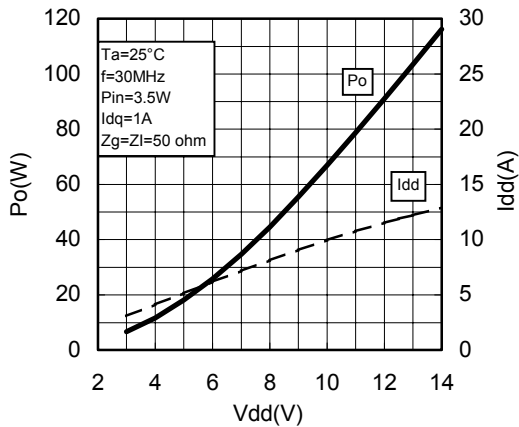
Pin-Po CHARACTERISTICS



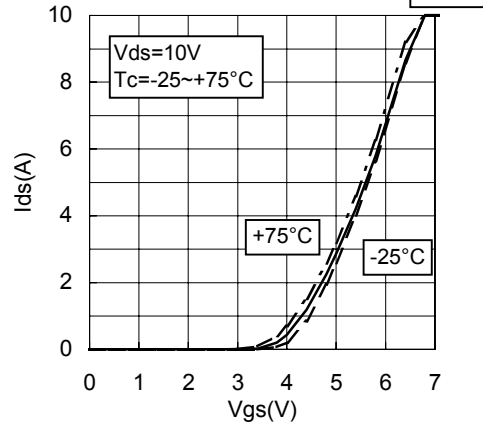
Pin-Po CHARACTERISTICS



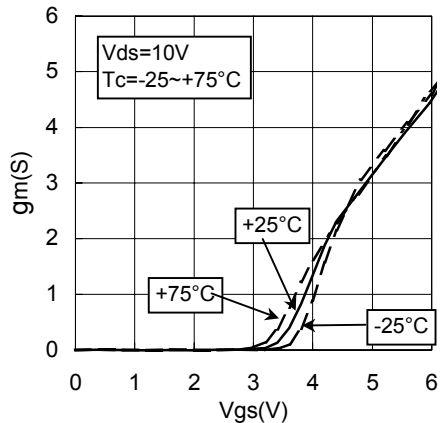
Vdd-Po CHARACTERISTICS

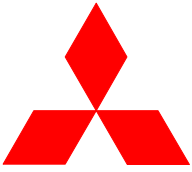


Vgs-Ids CHARACTERISTICS 2



Vgs-gm CHARACTERISTICS





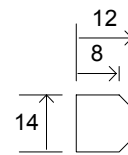
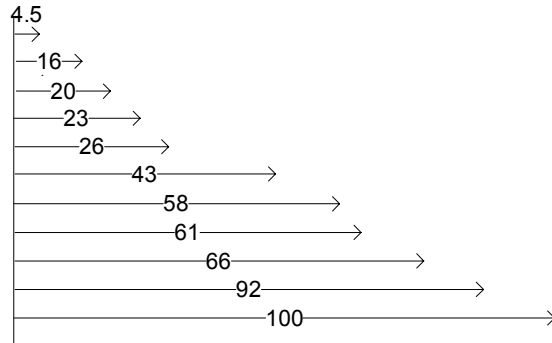
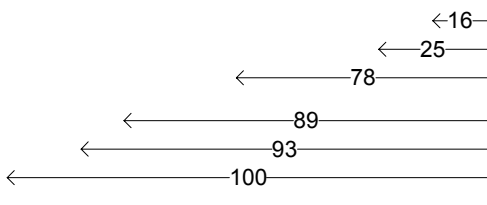
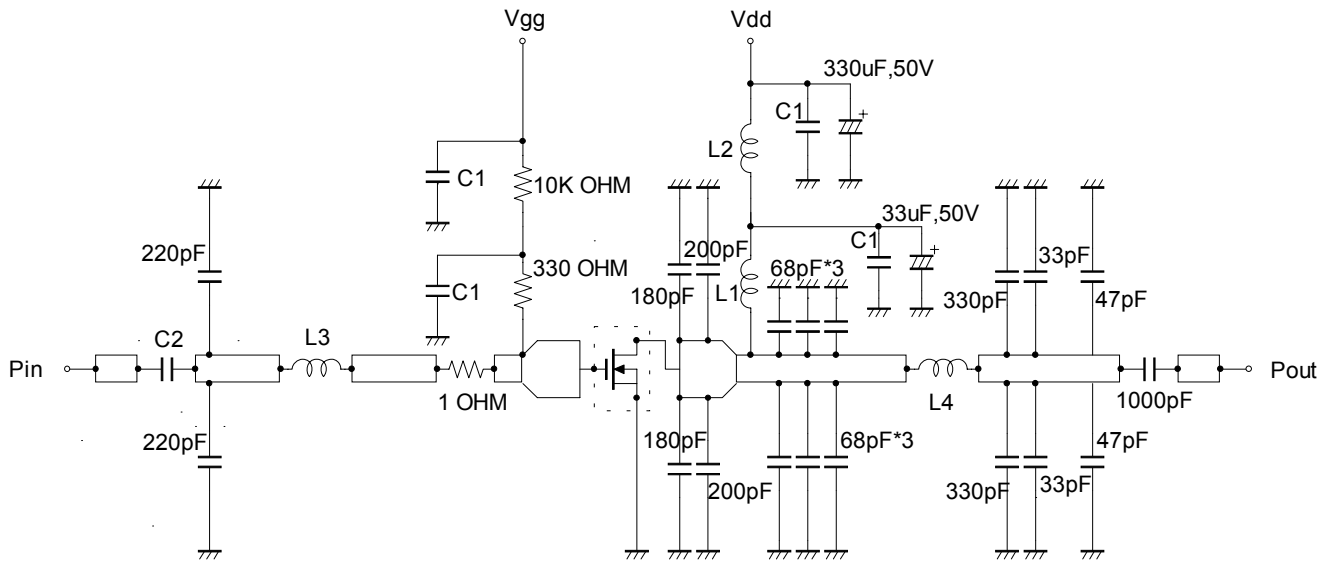
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TEST CIRCUIT(f=30MHz)



C1:100pF, 0.022uF, 0.1uF in parallel
C2:470uF*2 in parallel

L1:8Turns,I.D8mm,D1.6mm silver plated copper wire
L2:10Turns,I.D8mm,D1.6mm silver plated copper wire
L3:5Turns,I.D6mm,D0.7mm copper wire P=0.5mm
L4:1Turns,I.D10mm,D1.6mm silver plated copper wire

Dimensions:mm

Note:Board material-teflon substrate

micro strip line width=4.2mm / 50 OHM,er:2.7,t=1.6mm



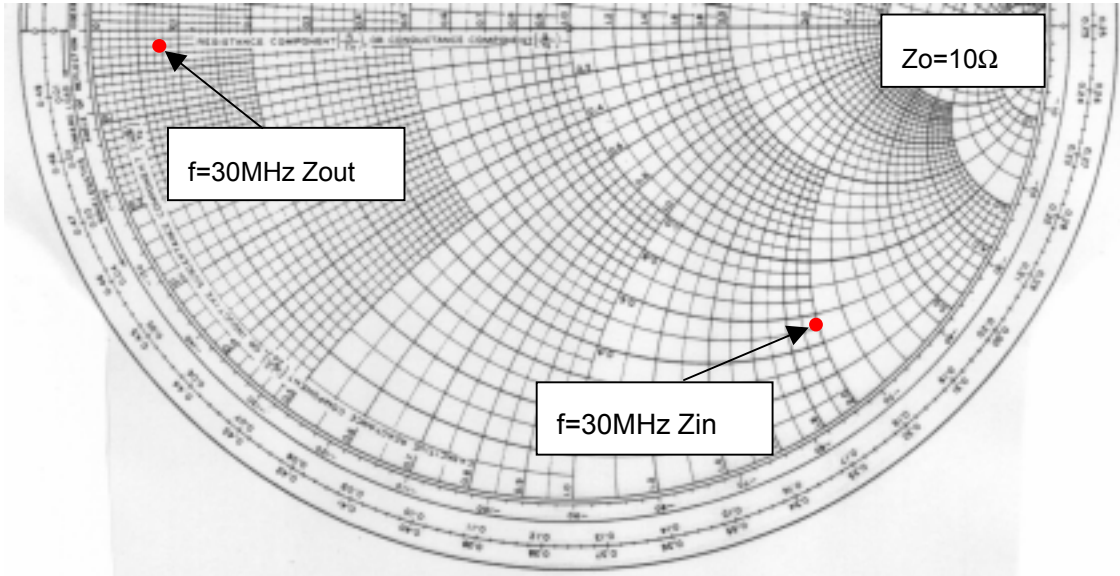
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INPUT/OUTPUT IMPEDANCE VS.FREQUENCY CHARACTERISTICS



Zin , Zout

| f (MHz) | Zin (ohm) | Zout (ohm) | Conditions |
|------------|--------------|---------------|------------|
| 30 | 5.28-j20.08 | 0.77-j0.22 | |



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RD70HHF1 S-PARAMETER DATA (@V_{dd}=12.5V, I_d=800mA)

| Freq. [MHz] | S11 | | S21 | | S12 | | S22 | |
|----------------|-------|--------|--------|-------|-------|-------|-------|--------|
| | (mag) | (ang) | (mag) | (ang) | (mag) | (ang) | (mag) | (ang) |
| 10 | 0.837 | -155.8 | 39.860 | 97.0 | 0.013 | 2.0 | 0.776 | -159.3 |
| 30 | 0.838 | -170.6 | 13.625 | 82.2 | 0.012 | -8.7 | 0.770 | -171.5 |
| 50 | 0.842 | -173.0 | 8.074 | 75.1 | 0.012 | -7.4 | 0.784 | -171.7 |
| 100 | 0.872 | -174.1 | 3.731 | 60.3 | 0.010 | -24.2 | 0.824 | -171.3 |
| 150 | 0.899 | -174.9 | 2.183 | 47.0 | 0.009 | -41.5 | 0.864 | -173.2 |
| 200 | 0.917 | -175.9 | 1.408 | 38.4 | 0.007 | -39.3 | 0.893 | -173.6 |
| 250 | 0.931 | -176.8 | 1.010 | 31.6 | 0.006 | -23.3 | 0.931 | -175.3 |
| 300 | 0.941 | -177.7 | 0.734 | 25.1 | 0.005 | -46.3 | 0.931 | -176.5 |
| 350 | 0.950 | -178.6 | 0.570 | 21.5 | 0.004 | -17.5 | 0.944 | -177.5 |
| 400 | 0.953 | -179.4 | 0.455 | 17.2 | 0.003 | 29.2 | 0.964 | -178.6 |
| 450 | 0.957 | 179.9 | 0.361 | 13.3 | 0.003 | -4.5 | 0.952 | -179.5 |
| 500 | 0.960 | 179.1 | 0.302 | 11.1 | 0.001 | 105.8 | 0.959 | 179.4 |
| 550 | 0.967 | 178.4 | 0.254 | 7.3 | 0.004 | 65.8 | 0.966 | 178.4 |
| 600 | 0.967 | 177.7 | 0.211 | 7.4 | 0.003 | 96.5 | 0.962 | 178.0 |
| 650 | 0.971 | 177.3 | 0.185 | 5.8 | 0.006 | 71.6 | 0.973 | 177.0 |
| 700 | 0.969 | 176.5 | 0.162 | 0.5 | 0.005 | 96.8 | 0.969 | 176.0 |
| 750 | 0.970 | 175.6 | 0.160 | 2.7 | 0.005 | 72.1 | 0.965 | 175.7 |
| 800 | 0.969 | 175.1 | 0.132 | 1.8 | 0.007 | 81.0 | 0.976 | 174.6 |
| 850 | 0.974 | 174.8 | 0.122 | -4.3 | 0.007 | 73.6 | 0.970 | 174.4 |
| 900 | 0.973 | 174.0 | 0.117 | -5.2 | 0.009 | 87.1 | 0.970 | 174.0 |
| 950 | 0.971 | 173.1 | 0.100 | 0.0 | 0.011 | 77.5 | 0.972 | 172.7 |
| 1000 | 0.976 | 172.5 | 0.087 | -0.5 | 0.011 | 73.8 | 0.972 | 172.6 |